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HAMBERG, Max

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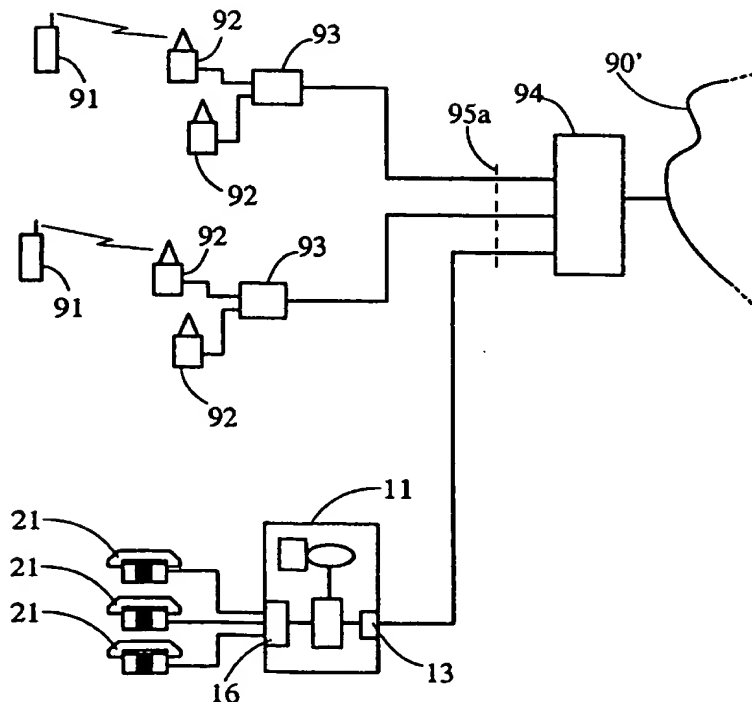
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(54) Title: METHOD AND NETWORK ELEMENT FOR CONNECTING A SUBSCRIBER TO A CELLULAR TELECOMMUNICATIONS NETWORK

(57) Abstract

This document discloses a method and an apparatus for connecting a subscriber apparatus or subscriber's network to a mobile network. The idea of the invention is that between a mobile network and a subscriber apparatus or subscriber's network there is placed a network element (11) which emulates the appropriate interface towards both of the networks attached to it. Furthermore, it is a task of the network element (11) to switch and, if necessary, concentrate calls between the mobile network and subscriber's network. In addition, the network element (11) advantageously comprises a database block (15) that stores the subscriber data needed by the mobile network, which data correspond to subscriber apparatus in the subscriber's network connected to the mobile network.



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## INTERNATIONAL SEARCH REPORT

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PCT/FI 99/00562

## A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

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IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,N0 classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9734437 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 18 Sept 1997 (18.09.97), page 6, line 1 - page 7, line 21, figure 1 --	1-21
X	US 5666399 A (B.M. BALES ET AL.), 9 Sept 1997 (09.09.97), column 1, line 14 - line 43; column 2, line 1 - line 31, figure 1 --	1-21
X	WO 9533348 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 7 December 1995 (07.12.95), page 6, line 32 - page 7, line 7; page 7, line 29 - line 38 --	1,14

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9716936 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 9 May 1997 (09.05.97), figure 3, abstract --	1-21
A	US 5771275 A (R. BRUNNER ET AL.), 23 June 1998 (23.06.98), abstract -- -----	1-21

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Information on patent family members

02/11/99

International application No.

PCT/FI 99/00562

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				WO	9827765 A	25/06/98

# METHOD AND NETWORK ELEMENT FOR CONNECTING A SUBSCRIBER TO A CELLULAR TELECOMMUNICATIONS NETWORK

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network element comprises a memory element storing the additional information possibly needed in the different emulations.

The method according to the invention is characterized by what is expressed in the independent claim directed to the method. The network element according to the invention is characterized by what is expressed in the independent claim directed to the network element. Other preferred embodiments of the invention are presented in the dependent claims.

By means of a separate network element connected to a mobile network it is possible to provide the users of a subscriber's network, such as a fixed telephone network, with the services of the subscriber's network through a mobile network. In a preferred embodiment of the invention the network element is designed to function in such a manner that the mobile network regards the subscriber's network or a subscriber apparatus in the subscriber's network as an element or elements belonging to the mobile network. The operation of the network element is such that it emulates at least one mobile network element towards the mobile network. Conversely, towards the subscriber apparatus the network element emulates the subscriber's network in question, thus producing the signals typical of the subscriber's network.

An advantage of the invention is that by means of the network element according to the invention a given network can be connected to a mobile network. Such a network may be an interphone network, for example. An especially advantageous arrangement can be achieved in the case of sparsely populated areas, wherein a population center can be advantageously connected to the fixed telephone network through a mobile network. Costs will be saved by the fact that there is no need to bring the fixed telephone network to the sparsely populated area over a long distance but calls can be placed using radio waves. The end user will also save costs as current low-cost subscriber apparatus, such as conventional phones, are very well suited to be used in connection with the network element. Moreover, comparing the acquisition cost of the network element and possible fixed subscriber apparatus with the cost of a mobile communications device, it can be seen that the cost of the network element and fixed subscriber apparatus is lower because of the rather simple technology used in them. Especially if the network element is purchased jointly by a population center, for example, telephone connections can be produced at very low costs. In addition to the fixed telephone network the above can be applied to other networks as well.



Another advantage of the invention is that the use of such a network element saves resources. For example in the case of a fixed network the resources of the telephone network of a given area must be dimensioned in accordance with all the fixed subscriber apparatus used in the area. Similarly, the resources of a mobile network in the same area need to be dimensioned according to all mobile communication devices existing in and possibly visiting the area. By means of a network element according to a preferred embodiment of the invention it is possible to combine the services of the fixed telephone network and the mobile network so that the total capacity for the switching center of a given area can be dimensioned according to the combined need, which is smaller than the sum of the capacities needed for separate networks. This can be generalized to apply to all separate telephone networks in which the network element can be used.

A third advantage of the invention is that by means of an apparatus according to the invention an end user of a fixed telephone network can be offered a familiar fixed subscriber apparatus for connecting to the network. In spite of the fact that mobile communication devices are made more and more user-friendly there are still people who find these apparatus intimidating and esoteric and dare not or know not how to use them. Elderly people in particular find mobile communication devices too difficult to use. People say, among other things, that these devices have too many and too small pushbuttons. It is just therefore that people would like to use their familiar fixed telephone apparatus everywhere, say, at the summer house, for example, and indeed the present invention provides a good solution for this.

As far as the mobile network operator is concerned, the network element offers new ways of providing services. At present, an operator concentrating on mobile communications can only offer a mobile subscription with the associated services to a customer. With the new network element the operator can also offer simple and conventional telephone subscriptions in addition to other subscriptions and various services associated with them. This results in competition on the market as regards the provision and providers of different telephone subscriptions, which usually is good for the customer.

Furthermore, an operator may provide the customer with a phone number that looks like a phone number of a fixed telephone subscription. In that case the subscriber's telephone subscription, as regards both the telephone apparatus and phone number, looks like a conventional fixed telephone network subscription. By means of a phone number that looks like a phone number of a fixed subscription it is possible

to eliminate the problem caused by the fact that many people are afraid to call a mobile phone, fearing, among other things, that it will be expensive. An operator could e.g. make a contract with a local phone company for the use of phone numbers resembling fixed subscriber's numbers in subscriber apparatus connected to the network element or otherwise arrange the use of phone numbers typical of that particular area.

The network element according to the invention makes it possible to transport the user's subscriber identity from a mobile communication device to the network element whereby the subscriber apparatus connected to the network element functions as a user terminal. The user may also transport the subscriber identity in the opposite direction, i.e. transfer the subscriber data corresponding to the subscriber apparatus to a SIM card, and continue using the telephone subscription through a mobile communication device. Thus the network element according to the invention facilitates the addition of mobility to fixed telephone networks as well as location updates from a fixed subscriber terminal to a mobile communication device and vice versa, and from a fixed subscriber terminal to a second fixed subscriber terminal.

By means of the network element according to the invention the user of a fixed subscriber apparatus can be offered all services of a modern digital wire network. Typically there are digital wire networks only in big cities at present. By means of the network element all these services can be offered to people living in sparsely populated areas as well. Typical services in a digital wire network include call transfer and answering services, for example. There are other services, too. Moreover, considering that the network element uses a mobile network, the user of the network element can be provided with all the mobile network services that can be controlled using the pushbuttons of a fixed subscriber apparatus.

The invention will now be described in more detail with reference to the preferred embodiments presented by way of example and to the accompanying drawing wherein

- Fig. 1 shows an embodiment of the network element according to the invention,  
Fig. 2 shows an embodiment of the network element according to the invention, wherein conventional fixed subscriber apparatus are connected to the input side of the network element,  
Fig. 3 shows an embodiment of the network element according to the invention, wherein switching centers of a fixed telephone network are connected to the input side of the network element,

- Fig. 4 shows an embodiment of the network element according to the invention, wherein a radio network is connected to the input side,
- Fig. 5 shows an embodiment of the network element according to the invention, wherein an interphone network is connected to the input side,
- 5 Fig. 6 shows a network element according to the invention in a mobile network wherein the network element emulates a radio interface, and
- Fig. 7 shows a network element according to the invention in a mobile network wherein the network element emulates an interface between a base station and base station controller.

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Like elements in the drawing are denoted by like reference designators.

Fig. 1 illustrates an embodiment of the network element 11 according to the invention. The network element 11 may be placed advantageously between two different networks, such as a mobile network and fixed telephone network, to emulate a suitable interface for each network. The emulation may be advantageously realized using a microprocessor 14, for example, which has been programmed so as to produce at least the signals required by each network connected to the network element 11.

The network element 11 may comprise in addition to the emulation block, such as a microprocessor 14, a switching block 12, such as a switching network circuit 12, input unit 16 and output unit 13. The function of the input unit 16 is to provide the necessary interface or interfaces at the input side of the network element and, conversely, the function of the output unit 13 is to provide the necessary interface or interfaces at the output side of the network element. For example, in an embodiment of the invention the input unit may comprise one or more analog line interface cards (LIA). The function of the switching network circuit 12 is advantageously at least to switch speech signals and, thus, telephone calls. 'Switching' may here also mean that while there may be a great number of subscriber apparatus connected to the input unit 16 of the network element 11, the network element 11 would still be able to connect the calls, utilizing prior-art technology, to the outlets of the output unit 13, i.e. to the mobile network signal lines connected to the output unit of which there may be less than there are inlets at the input side, i.e. signal lines in the system connected to the mobile network. In this case, the mobile network signal lines may be e.g. speech channels of the mobile network. 'Input side' here refers to that side of the network element 11 which is not connected to the host network and, conversely, 'output side' refers to the side connected to the host network. So, in addi-

tion to or in parallel with switching functions the network element may include concentrating functions as well.

In this description, 'host network' refers to the mobile network or its part, such as a core network (CN), to which the entity to be connected, which typically is smaller  
5 than the mobile network, is to be connected by means of the network element 11.

In addition to the components mentioned above the network element 11 may include at least a database block 15 to provide a database by means of which a subscriber apparatus connected to the network element 11 can be advantageously identified. For example, if the host network is a GSM network, the subscriber data cor-  
10 responding to the information in the SIM card, i.e. the data or at least part of the data corresponding to the subscriber data of the host network, can be stored in said database or storage element 15. The database 15 may be stored e.g. in a memory circuit or other storage element. The database can preferably be used for storing data required by the host network, which data cannot be obtained from apparatus  
15 connected through the network element 11. It is obvious to a person skilled in the art that the storing of the data corresponding to the database 15 in the network element 11 can be realized in other ways, too. In a preferred embodiment the network element 11 may be realized e.g. in such a manner that the data corresponding to the database 15 may be stored in a system located in the network operator's premises  
20 from which place the data can be read when necessary. However, the practicability of such an arrangement can be questioned as it would load the network unnecessarily due to increased signal traffic. Centralization of subscriber data in a single database would, however, bring with it the advantages typically associated with centralization.

25 In an embodiment according to the invention it is possible to connect conventional fixed network subscriber apparatus 21 to the input side 16 of the network element 11. An example of such an arrangement is shown in Fig. 2. In such an embodiment the system to be connected to the host network through the network element may comprise e.g. conventional telephones only, plus the necessary interface lines. A  
30 fixed subscriber apparatus can be connected to the network element 11 through the input unit 16, which advantageously is a special subscriber interface card, for example. The connection of multiple fixed subscriber apparatus 21 to the network element 11 may be realized e.g. in such a manner that there is one subscriber interface card per each fixed subscriber apparatus 21. The connection may also be  
35 realized such that all fixed subscriber apparatus 21 are connected to the network

element 11 through one subscriber interface card. Other solutions, too, can be advantageously used for connecting the subscriber apparatus to the network element 11. In this embodiment the network element 11 realizes the functions required by the subscriber apparatus 21, such as e.g. off-hook and on-hook detection, generation of ringing signal and other necessary functions. Fixed subscriber apparatus 21 are identified in some known manner, e.g. based on the signal line via which the signals of the subscriber apparatus come to the network element. Subscriber apparatus identification may also be realized e.g. by means of signaling, examples of which will be given later on.

Fig. 2 also shows a small portion of the host network and its various elements 92, 93, 94, 90'. In this example the host network comprises elements typical of a mobile network, such as base stations 92, base station controllers 93 controlling one or more base stations, and mobile switching centers 94. Fig. 2 also shows mobile stations 91 connected via radio links to the base stations 92 and the rest of the host network 90'. In the example of Fig. 2 the network element 11 is connected to a mobile switching center 94, realizing the functionality according to the interface between a mobile switching center and base station controller. To the host network the network element 11 thus looks like a base station controller. In this kind of an embodiment the output unit 13 realizes the functionality required by the transmission line between the network element and mobile switching center. In a GSM network this interface 95a between the mobile switching center (MSC) and base station controller (BSC) is called the A interface. In the case of a UMTS network the corresponding interface is called the Iu interface.

In a system according to Fig. 2, placing a call to the subscriber apparatus 21 may according to a preferred embodiment of the invention be carried out e.g. as follows: Let the communications network 90' be a GSM network connected to a conventional telephone network. When a call from the conventional telephone network arrives in the GSM network it is directed to that MSC in the GSM network in the area of which the subscriber apparatus 21 has been registered. Said MSC detects that the subscriber apparatus is registered to be located in the area of the BSC emulated by the network element 11. So the MSC sends a paging message to the network element 11, which responds to the MSC using a page response message according to the A interface. The network element converts the IMSI code mentioned in the paging message into its own identifier, i.e. performs the necessary identity conversion which in the example of Fig. 2 corresponds to detecting the subscriber line that corresponds to the IMSI code. After that the network element generates the

ringing signal for the subscriber line in question. As the user answers the call the network element starts converting speech signals between the subscriber apparatus and the GSM network. When the call is being established the MSC typically verifies, using an authentication procedure, that the terminal in question is the correct terminal. In such a case the network element 11 emulates the operation of the terminal using its subscriber data.

In a preferred embodiment of the invention not all subscriber data that cannot be obtained from subscriber apparatus 21 are stored in a database 15, but at least part of said data are automatically generated as it is needed. This way it is possible to reduce the amount of data stored in the database. The data may be automatically generated e.g. on the basis of some constant information, such as the subscriber's phone number, so that if the method of generation remains the same, the data generated automatically will always be the same, too. Thus it is possible to produce e.g. a fixed piece of information associated with the subscriber data, say, identification information for a terminal. If the information required need not remain constant every time, it may also be generated on the basis of the time of day or randomly, for example.

If some data, such as e.g. certain security parameters, cannot be removed from the SIM card, such data have to be copied from the SIM card to the network element. In that case the network will preferably verify according to security requirements that only one piece of the information is actually used.

In a preferred embodiment of the invention the network element 11 may be connected to a switching apparatus or a corresponding element in a local exchange. Fig. 3 shows such an arrangement in which the network element 11 is functionally connected to a switching apparatus 31 in a local telephone network. It is possible to connect in the manner shown in Fig. 3 more than one switching apparatus 31 to the network element 11 either directly, as shown in Fig. 3, or through other switching apparatus. In this kind of an embodiment the identification of the subscriber apparatus may be realized e.g. by means of signaling used by the switching apparatus 31. Examples of such signaling methods are the ISUP, SS7, and R2 signaling protocols used in the conventional telephone network. In this kind of an embodiment the network element 11 emulates to the switching apparatus the desired interface known to the switching apparatus or e.g. another switching apparatus. Fig. 3 also shows the host network 90.

Fig. 4 illustrates a preferred embodiment of the invention in which a radio network 41 is connected to the host network through the network element 11. The radio network 41 may be e.g. a company's internal radio communication network or a wireless interphone network. In the example depicted in Fig. 4 the radio network 41 includes base stations 43 and switching apparatus 42 of the radio network. The radio network 41 further includes wireless terminals 44 connected to the rest of the radio network 41 via base stations 43. In this kind of an embodiment the wireless terminals 44 correspond to the subscriber apparatus 21 of the examples described above, so that the network element realizes the emulation towards the host network on the basis of the wireless terminal identification data and host network subscription data stored in its memory. In this kind of an embodiment the network element 11 realizes the desired radio network 41 interface functionality towards the radio network 41. For example in the case of a wireless interphone system, such as a DECT system, the network element 11 may emulate a switching apparatus of a conventional telephone system towards the DECT system 41, so that as far as the DECT system is concerned the situation is the same as in the prior art where the DECT system is connected to a switching center of a fixed telephone network, say, the switching center of a company or building.

Generally, the invention network element can be used to emulate functions of terminals, such as mobile communication devices, in the host network, which functions are not provided by the terminals of the system connected to the host network. Particularly the network element can be used to emulate functions requiring processing, which the terminals of said system cannot realize e.g. because they do not have a processor, their processing capacity is too small for realizing the functions in question, or it is impossible to store in the terminal the subscriber data needed by the host network. So, the emulation of a SIM card according to the examples above is just one advantageous example of such functions.

Above it was disclosed by way of example that the network element advantageously includes the additional information, such as e.g. the subscription data of the mobile network, which is needed in the emulation towards the host network but which cannot be obtained from the system connected to the host network. Furthermore, in some embodiments it may be possible that the host network does not provide all the data and services needed by the system connected to the host network. In that case the network element emulates the services needed by said system on the basis of the additional information stored in the network element.

Fig. 5 illustrates a preferred embodiment of the invention in which the network element is used to connect an interphone network 51 of, say, a company or building to the host network 90. Here the interphone network 51 may be e.g. a conventional intercom network, an Intranet network realized by means of a communications network of a company or building, a DECT network or some other interphone network. In the example of Fig. 5 the interphone network comprises several subscriber apparatus 21.

It is also possible to connect some other network, which is not mentioned above, to the input unit 16 of the network element 11. It is obvious to one skilled in the art that the network element 11 can be used to connect to the host network 90 a combination of the networks mentioned above as examples or other similar networks.

The network element may realize towards the host network other interfaces than those mentioned above. Fig. 6 shows a structure according to a preferred embodiment of the invention. In Fig. 6, a plurality of subscriber apparatus 21 are connected to the network element, and the interface between the network element 11 and host network 92, 93, 90 is a radio interface 95b. In this kind of an embodiment the network element emulates a number of mobile communication devices. Of the components of the host network 90 Fig. 6 shows base stations 92 and a base station controller 93. In this kind of an embodiment the network element comprises a transmitter unit to which the necessary antenna equipment is connected. Such a transmitter unit can be realized e.g. in the output unit 13.

Fig. 7 shows a structure according to a preferred embodiment of the invention. In Fig. 7, the network element realizes an interface 95c between a base station and base station controller so that as far as the host network is concerned, the network element functions as a base station. In an embodiment in which the host network is a GSM network, the interface 95c is an Abis interface. In an embodiment in which the host network is a UMTS network, the interface 95c is an Iub interface.

The network element 11 may comprise other elements than those mentioned in the examples above. Such elements include e.g. elements intended for the adaptation of transmission rates, needed when the network element 11 is placed between two networks using different transmission rates. Other necessary adaptation elements may also be included in the network element 11.

Above it was disclosed by way of example that the signals connected by means of the network element are speech signals. The invention is not, however, limited to



this. For example, if both the host network and the system connected to the host network support other types of communications connections, the signals connected may be signals containing other types of data as well.

- 5 The name of a given functional unit, such as a base station controller, is often different in different mobile communication systems. For example, the nearest equivalent in the UMTS to the base station controller (BSC) of the GSM system is, according to some specifications, the radio network controller (RNC). In the claims attached hereto the terms base station controller and mobile switching center are not in any way restricted to refer only to the elements of the GSM system, but the terms
- 10 cover the functionally equivalent elements of other mobile communication systems as well. In the claims attached hereto the term subscriber apparatus refers to the appropriate apparatus in the system to be connected, such as e.g. a conventional phone in a fixed telephone network, a terminal of a wireless interphone network or a corresponding apparatus.
- 15 Above the invention was described referring to some of its preferred embodiments but it is obvious that the invention may be modified in many different ways in accordance with the inventional idea defined by the claims attached hereto.

## Claims

1. A method for connecting a system comprising subscriber apparatus to a mobile network, **characterized** in that a network element (11) connected to the mobile network is used to
  - 5 - emulate towards said mobile network a desired interface of said mobile network,
  - emulate towards said system a desired interface of said system, and
  - connect signals of said system to the mobile network and signals of the mobile network to said system.
- 10 2. A method according to claim 1, **characterized** in that at least part of the subscriber data corresponding to the subscriber data of a terminal of the mobile network is stored in the network element.
- 15 3. A method according to claim 1, **characterized** in that said network element (11) is used to emulate mobile network functions associated with mobile communication devices of the mobile network that are not realized by the subscriber apparatus in said system.
4. A method according to claim 2 and 3, **characterized** in that at least a part of said functions are functions dependent on subscriber information.
- 20 5. A method according to claim 1, **characterized** in that the network element is used to receive signals from said system, which signals are coming from signal lines of which there are a certain first number, and received signals are concentrated into signal lines of the mobile network of which there are a certain second number such that said second number is smaller than said first number.
6. A method according to claim 1, **characterized** in that said interface is an interface between a base station controller and mobile switching center.
- 25 7. A method according to claim 1, **characterized** in that said interface is an interface between a base station controller and base station.

8. A method according to claim 1, **characterized** in that said interface is a radio interface between a mobile communication device and base station.
9. A method according to claim 1, **characterized** in that at least part of the mobile network subscriber data needed by the network element (11) is read from a database (15) stored in the network element.
10. A method according to claim 1, **characterized** in that at least part of the mobile network subscriber data needed by the network element (11) is generated automatically.
11. A method according to claim 1, **characterized** in that said system comprises at least one fixed telephone network.
12. A method according to claim 1, **characterized** in that said system comprises at least one radio network (41).
13. A method according to claim 1, **characterized** in that said system comprises at least one interphone network (51).
14. A network element (11), **characterized** in that it is adapted so as to be connected to a mobile network in order to connect a system with subscriber apparatus to the mobile network through said network element, and that it comprises
- an emulation block for emulating mobile network functions not found in said system, and
  - a switching block for connecting signals coming from said system to the mobile network.
15. A network element according to claim 14, **characterized** in that it comprises a storage element for storing mobile network subscriber data.
16. A network element according to claim 14, **characterized** in that said emulation block is arranged so as to emulate mobile network functions associated with

mobile communication devices of the mobile network which are not provided by said subscriber apparatus in said system.

17. A network element according to claim 14, **characterized** in that it comprises in addition to the emulation block an output unit (13) for realizing functionality according to a predetermined interface of said mobile network.

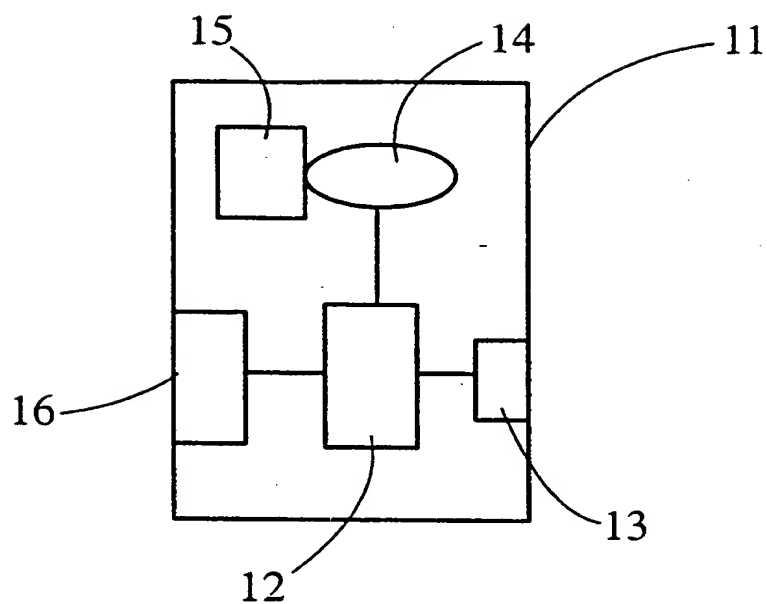
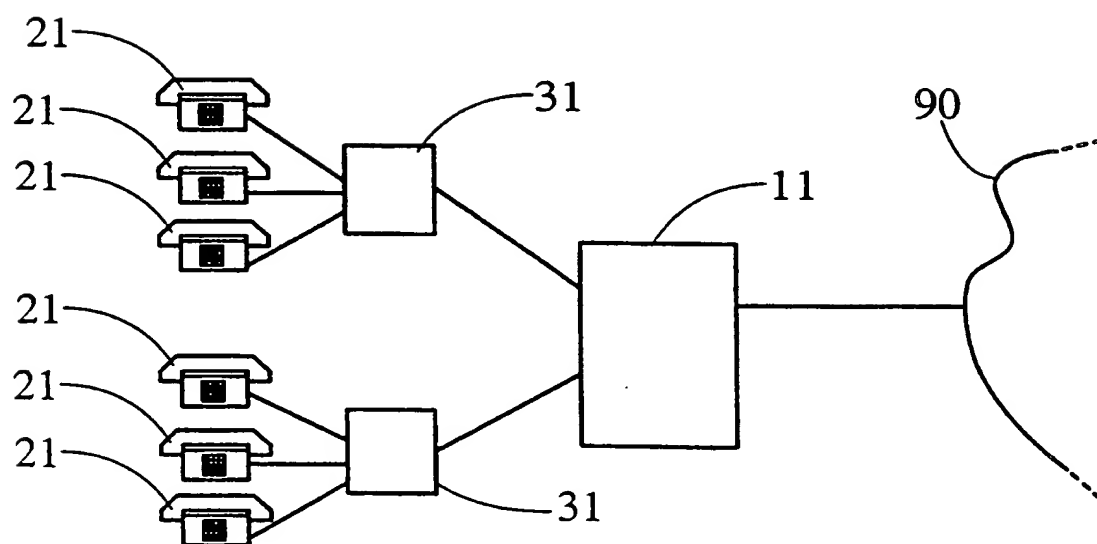
18. A network element according to claim 17, **characterized** in that said interface is an interface between a base station controller and mobile switching center.

19. A network element according to claim 17, **characterized** in that said interface is an interface between a base station and base station controller.

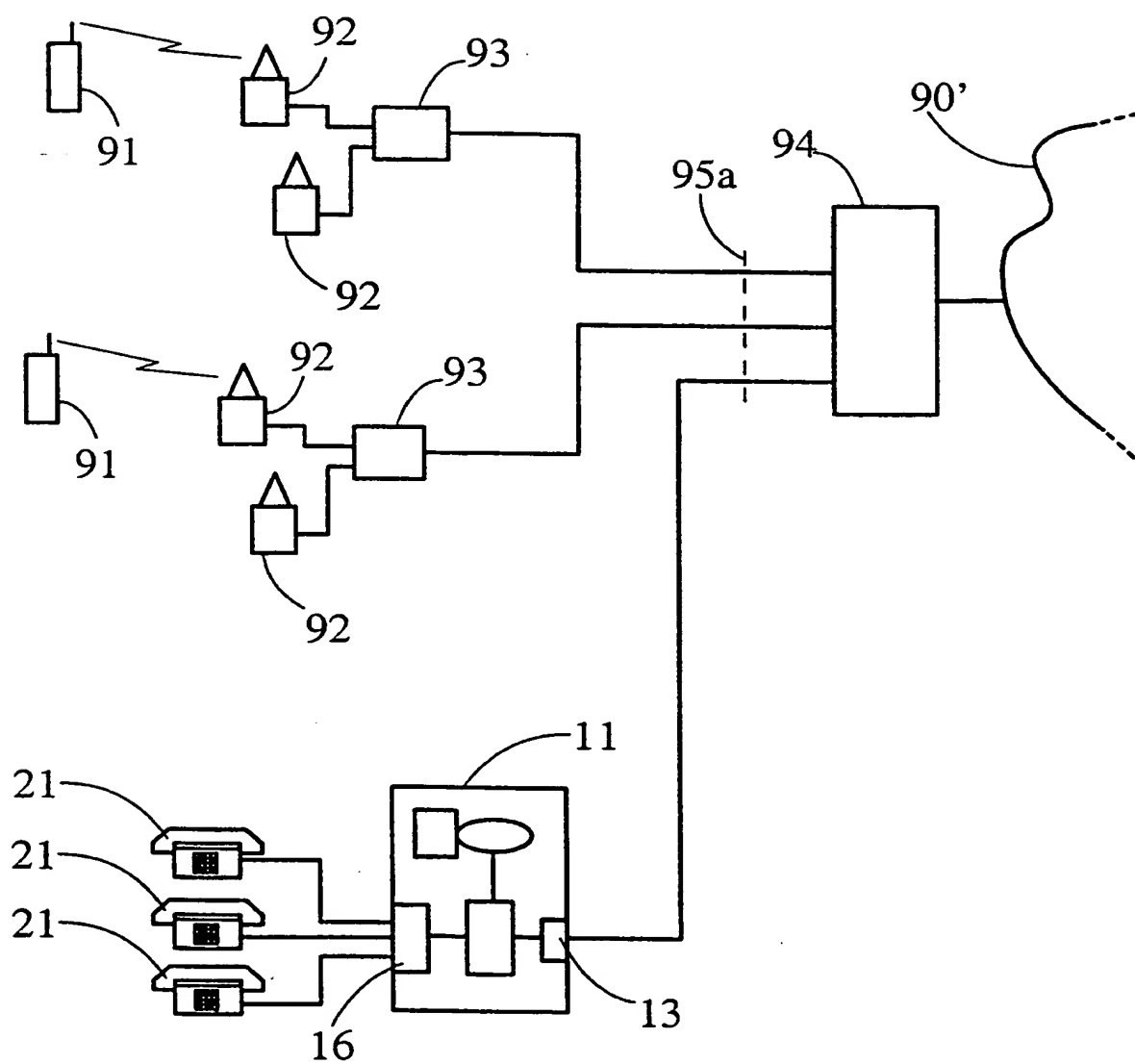
20. A network element according to claim 17, **characterized** in that said interface is an interface between a mobile communication device and base station.

21. A network element according to claim 14, **characterized** in that it further comprises a database block (15) for storing mobile network subscription data corresponding to subscriber apparatus in said system.

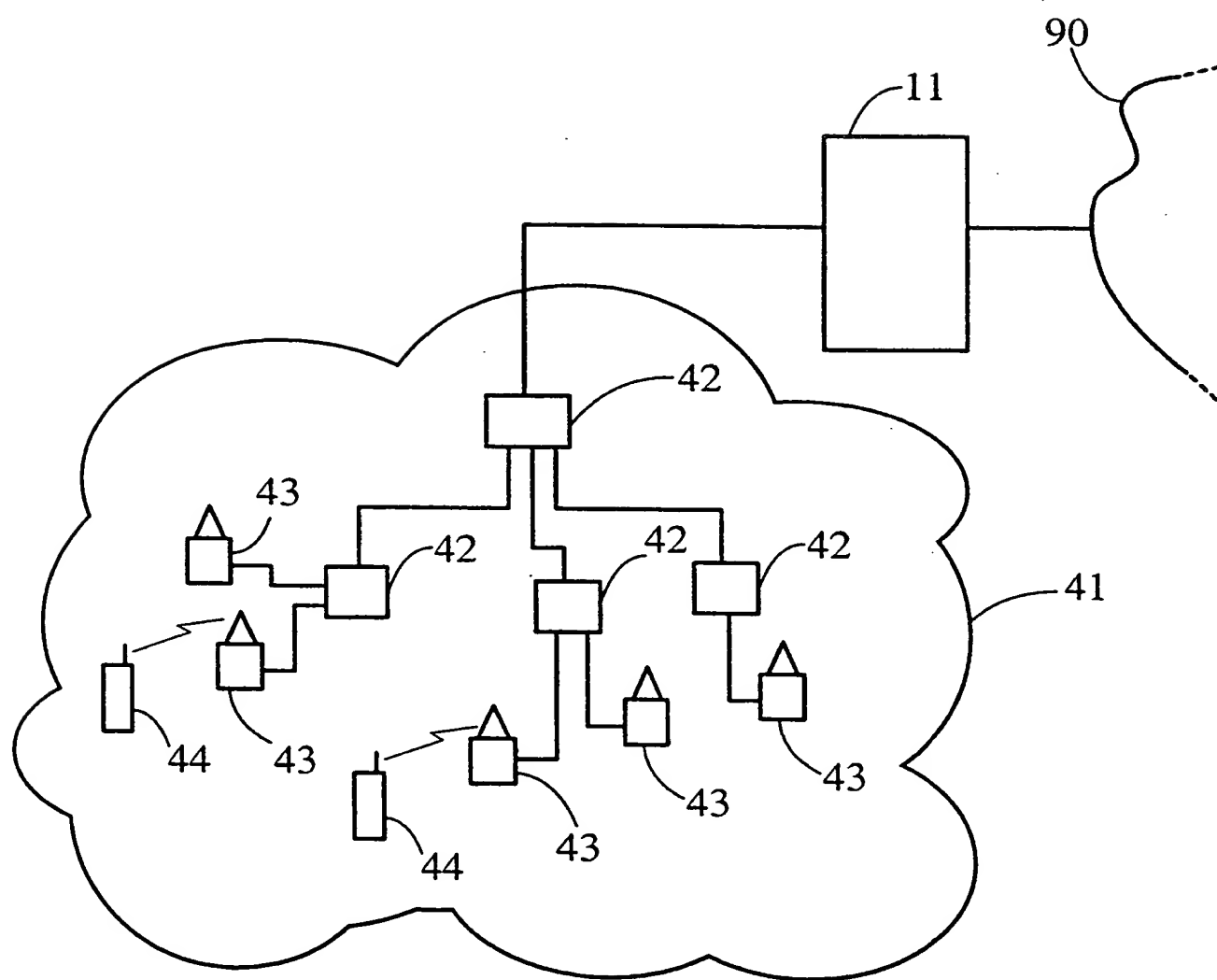
1 / 4

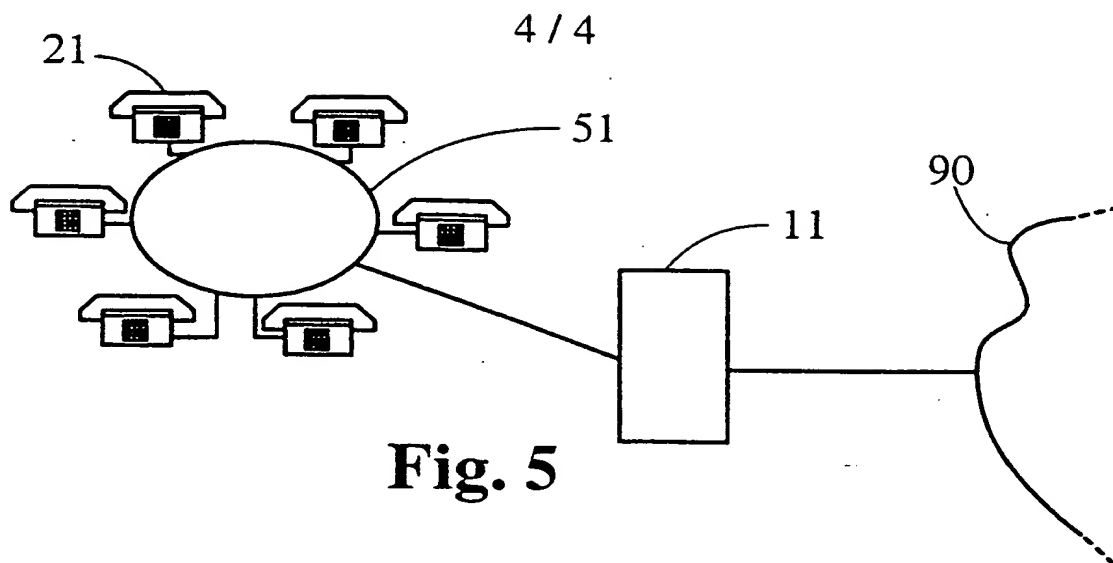
**Fig. 1****Fig. 3**

2 / 4

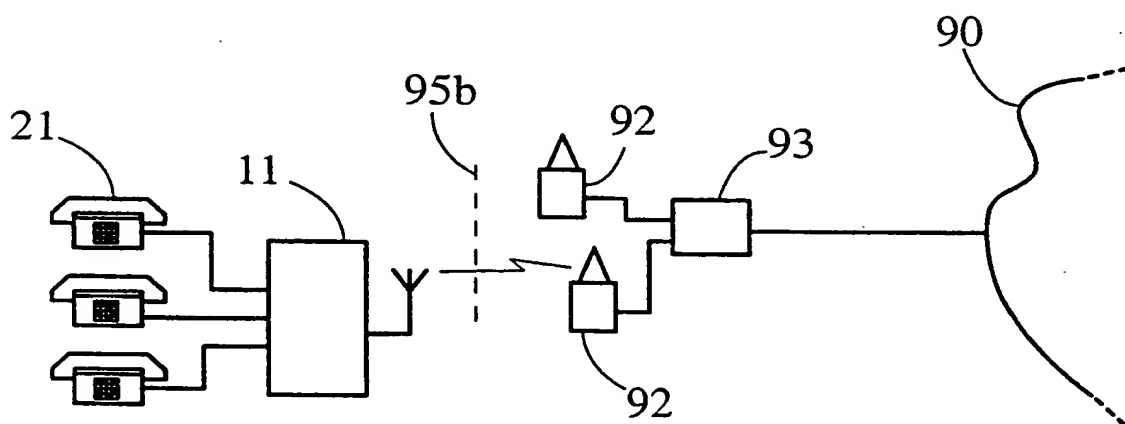
**Fig. 2**

3 / 4

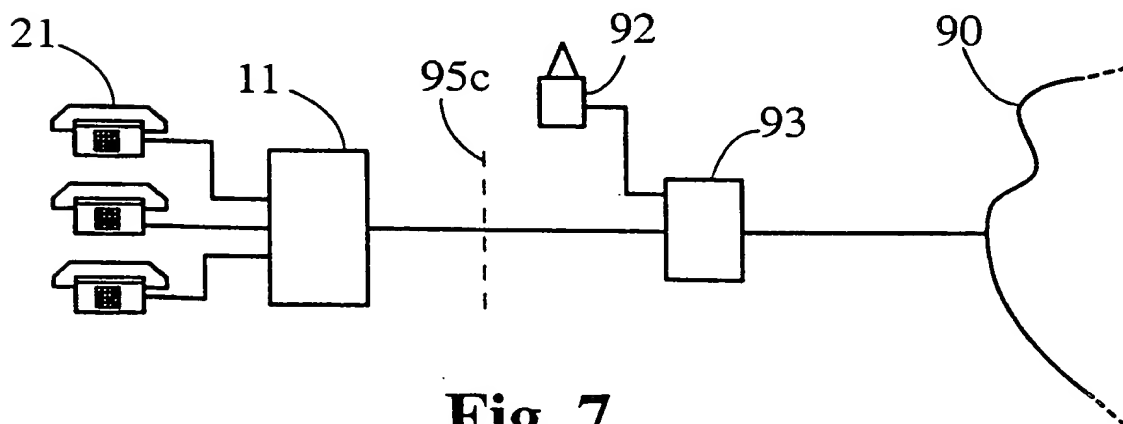
**Fig. 4**



**Fig. 5**



**Fig. 6**



**Fig. 7**



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 99/00562

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/20

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9734437 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 18 Sept 1997 (18.09.97), page 6, line 1 - page 7, line 21, figure 1 --	1-21
X	US 5666399 A (B.M. BALES ET AL.), 9 Sept 1997 (09.09.97), column 1, line 14 - line 43; column 2, line 1 - line 31, figure 1 --	1-21
X	WO 9533348 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 7 December 1995 (07.12.95), page 6, line 32 - page 7, line 7; page 7, line 29 - line 38 --	1,14



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

1 December 1999

Date of mailing of the international search report

03 -12- 1999

Name and mailing address of the ISA/

Swedish Patent Office

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Authorized officer

Tomas Erlandsson/AE

Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 99/00562

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9716936 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 9 May 1997 (09.05.97), figure 3, abstract --	1-21
A	US 5771275 A (R. BRUNNER ET AL.), 23 June 1998 (23.06.98), abstract -- -----	1-21

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

02/11/99

International application No.  
PCT/FI 99/00562

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9734437 A1	18/09/97	AU 2049097 A	01/10/97
		CA 2247979 A	18/09/97
		CN 1217861 A	26/05/99
		EP 0886984 A	30/12/98
		US 5890064 A	30/03/99
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US 5666399 A	09/09/97	AU 5032696 A	10/10/96
		CA 2167442 A	01/10/96
		EP 0735789 A	02/10/96
		JP 8289352 A	01/11/96
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WO 9533348 A1	07/12/95	AU 692880 B	18/06/98
		AU 2686495 A	21/12/95
		CA 2190257 A	07/12/95
		CN 1150511 A	21/05/97
		EP 0763308 A	19/03/97
		FI 964774 A	29/11/96
		JP 10501380 T	03/02/98
		SE 9401879 A	01/12/95
		US 5878343 A	02/03/99
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WO 9716936 A1	09/05/97	AU 7511396 A	22/05/97
		CA 2236102 A	09/05/97
		EP 0858714 A	19/08/98
		NO 981910 A	26/06/98
		SE 505660 C	29/09/97
		SE 9503828 A	01/05/97
-----			
US 5771275 A	23/06/98	AU 7740998 A	15/07/98
		WO 9827765 A	25/06/98

## Claims

1. A method for connecting a system comprising subscriber apparatus to a mobile network, **characterized** in that a network element (11) connected to the mobile network is used to
- 5 - emulate towards said mobile network a desired interface of said mobile network,  
- emulate towards said system a desired interface of said system, and  
- connect signals of said system to the mobile network and signals of the mobile network to said system.
2. A method according to claim 1, **characterized** in that at least part of the sub-  
10 scriber data corresponding to the subscriber data of a terminal of the mobile network is stored in the network element.
3. A method according to claim 1, **characterized** in that said network element (11) is used to emulate mobile network functions associated with mobile communication devices of the mobile network that are not realized by the subscriber apparatus in said system.  
15
4. A method according to claim 2 and 3, **characterized** in that at least a part of said functions are functions dependent on subscriber information.
5. A method according to claim 1, **characterized** in that the network element is used to receive signals from said system, which signals are coming from signal lines  
20 of which there are a certain first number, and received signals are concentrated into signal lines of the mobile network of which there are a certain second number such that said second number is smaller than said first number.
6. A method according to claim 1, **characterized** in that said interface is an interface between a base station controller and mobile switching center.
- 25 7. A method according to claim 1, **characterized** in that said interface is an interface between a base station controller and base station.

8. A method according to claim 1, **characterized** in that said interface is a radio interface between a mobile communication device and base station.
9. A method according to claim 1, **characterized** in that at least part of the mobile network subscriber data needed by the network element (11) is read from a database (15) stored in the network element.
10. A method according to claim 1, **characterized** in that at least part of the mobile network subscriber data needed by the network element (11) is generated automatically.
11. A method according to claim 1, **characterized** in that said system comprises at least one fixed telephone network.
12. A method according to claim 1, **characterized** in that said system comprises at least one radio network (41).
13. A method according to claim 1, **characterized** in that said system comprises at least one interphone network (51).
14. A network element (11), **characterized** in that it is adapted so as to be connected to a mobile network in order to connect a system with subscriber apparatus to the mobile network through said network element, and that it comprises
- an emulation block for emulating mobile network functions not found in said system, and
  - a switching block for connecting signals coming from said system to the mobile network.
15. A network element according to claim 14, **characterized** in that it comprises a storage element for storing mobile network subscriber data.
16. A network element according to claim 14, **characterized** in that said emulation block is arranged so as to emulate mobile network functions associated with

mobile communication devices of the mobile network which are not provided by said subscriber apparatus in said system.

17. A network element according to claim 14, **characterized** in that it comprises in addition to the emulation block an output unit (13) for realizing functionality according to a predetermined interface of said mobile network.
18. A network element according to claim 17, **characterized** in that said interface is an interface between a base station controller and mobile switching center.
19. A network element according to claim 17, **characterized** in that said interface is an interface between a base station and base station controller.
20. A network element according to claim 17, **characterized** in that said interface is an interface between a mobile communication device and base station.
21. A network element according to claim 14, **characterized** in that it further comprises a database block (15) for storing mobile network subscription data corresponding to subscriber apparatus in said system.

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

15

Applicant's or agent's file reference 48178/ML/MM	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/FI99/00562	International filing date (day/month/year) 24/06/1999	Priority date (day/month/year) 24/06/1998
International Patent Classification (IPC) or national classification and IPC H04Q7/20		
Applicant NOKIA NETWORKS OY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  05/01/2000	Date of completion of this report  25.09.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Schweitzer, J-C  Telephone No. +49 89 2399 8963 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/FI99/00562

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-11 as originally filed

**Claims, No.:**

1-20 as received on 25/05/2000 with letter of 22/05/2000

**Drawings, sheets:**

1/2,2/2 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI99/00562

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes: Claims 1 - 20
	No: Claims
Inventive step (IS)	Yes: Claims 1 - 20
	No: Claims
Industrial applicability (IA)	Yes: Claims 1 - 20
	No: Claims

### 2. Citations and explanations

**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Concerning section V.2 (reasoned statement under Article 35(2) PCT)**

**Claim 1** (to be clarified as indicated in section VIII below) relates to a method for connecting a telephone system comprising a subscriber apparatus, e.g. a fixed (conventional) telephone set, to a mobile network, e.g. of the GSM type, using a network element which stores information corresponding to information in a subscriber identity module (SIM) of a mobile terminal. Based on said stored information, the claimed method emulates towards said telephone system or mobile network the desired interfaces of said system and network, respectively, and connects signals of said system to said mobile radio network, and vice-versa. In this way, a subscriber can transfer the subscriber information, i.e. his identity, from his mobile telephone to the network element to which a fixed terminal is attached, whereby the fixed terminal (such as an old rotary switch telephone) functions as a replacement for his mobile phone, all functions required by the fixed terminal being realized by the network element.

Such a method allowing to emulating the functionality of a terminal based on the information of a SIM card by the addition of a single network element into a radio access network, as claimed, is neither taught, nor rendered obvious, alone or in combination, by the prior art documents acknowledged in the description or cited in the International Search Report. The nearest prior art is given by the cited reference **WO-A-97/34437 (Ericsson)**, which teaches a method for interfacing a fixed telephone system and a mobile radio network using a so-called WO-interface which translates signals between the fixed telephone system and mobile network and connects signals therebetween, without however emulating a SIM card.

Claim 1 is therefore novel and considered to involve the required inventive step, Articles 33(2) and (3) PCT. The subject-matter of claim 1 is also industrially applicable.

The same applies to independent **claim 13**, which is directed to a network element permitting to carry out the method defined in claim 1. Claim 13, therefore, equally meets all the requirements of Article 33 PCT.

Dependent claims 2 to 12 and 14 to 20 relate to further implementing details of the method and network element defined by the independent claims 1 and 13, respectively, and are thus equally novel, inventive and industrially applicable.

**Concerning section VII (form and contents).**

In order to meet the requirements of Rule 5.1.(a),(ii) PCT, the relevant prior art document **WO-A-97/34437** noted above should have been acknowledged by reference and briefly discussed in the introductory part of the description.

**Concerning section VIII (clarity).**

In claim 1, the expressions "emulating towards said mobile network a desired interface" and "emulating towards said system a desired interface" are not fully clear, contrary to Article 6 PCT. Actually, according to the description, mobile or fixed network functions associated with mobile communications devices or fixed terminals are emulated.

In addition, it is not clear from the present wording that these functions are emulated in dependence on the stored SIM information, as no link between the claimed step of storing information and the steps of emulating/connecting is presently given in claim 1. As the principle of emulating the functionality of a terminal based on the stored subscriber information is considered to be essential for the understanding and the correct operation of the invention, it should also be clearly defined in claim 1, so as to meet the requirement following from Article 6 PCT taken in combination with Rule 6(3)(b) PCT, that any independent claim must contain all the technical features essential to the invention.

The same objections essentially apply to apparatus claim 13.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>48178</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/FI 99/00562</b>	International filing date (day/month/year) <b>24 June 1999</b>	(Earliest) Priority Date (day/month/year) <b>24 June 1998</b>
Applicant <b>NOKIA TELECOMMUNICATIONS OY et al.</b>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
2. ☐ Unity of invention is lacking (See Box II).
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing
  - ☐ filed with the international application.
  - ☐ furnished by the applicant separately from the international application,
    - ☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
  - ☐ transcribed by this Authority.
4. With regard to the title, ☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:
5. With regard to the abstract,
  - ☒ the text is approved as submitted by the applicant.
  - ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:  
Figure No. 2 ☒ as suggested by the applicant. ☐ None of the figures.  
☐ because the applicant failed to suggest a figure.  
☐ because this figure better characterizes the invention.

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/20

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9734437 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 18 Sept 1997 (18.09.97), page 6, line 1 - page 7, line 21, figure 1 --	1-21
X	US 5666399 A (B.M. BALES ET AL.), 9 Sept 1997 (09.09.97), column 1, line 14 - line 43; column 2, line 1 - line 31, figure 1 --	1-21
X	WO 9533348 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 7 December 1995 (07.12.95), page 6, line 32 - page 7, line 7; page 7, line 29 - line 38 --	1,14

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

1 December 1999

Date of mailing of the international search report

03 -12- 1999

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Tomas Erlandsson/AE

Telephone No. +46 8 782 25 00

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9716936 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 9 May 1997 (09.05.97), figure 3, abstract  --	1-21
A	US 5771275 A (R. BRUNNER ET AL.), 23 June 1998 (23.06.98), abstract  -- -----	1-21

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

02/11/99

International application No.

PCT/FI 99/00562

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
WO	9734437	A1	18/09/97	AU	2049097 A	01/10/97
				CA	2247979 A	18/09/97
				CN	1217861 A	26/05/99
				EP	0886984 A	30/12/98
				US	5890064 A	30/03/99
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US	5666399	A	09/09/97	AU	5032696 A	10/10/96
				CA	2167442 A	01/10/96
				EP	0735789 A	02/10/96
				JP	8289352 A	01/11/96
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WO	9533348	A1	07/12/95	AU	692880 B	18/06/98
				AU	2686495 A	21/12/95
				CA	2190257 A	07/12/95
				CN	1150511 A	21/05/97
				EP	0763308 A	19/03/97
				FI	964774 A	29/11/96
				JP	10501380 T	03/02/98
				SE	9401879 A	01/12/95
				US	5878343 A	02/03/99
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WO	9716936	A1	09/05/97	AU	7511396 A	22/05/97
				CA	2236102 A	09/05/97
				EP	0858714 A	19/08/98
				NO	981910 A	26/06/98
				SE	505660 C	29/09/97
				SE	9503828 A	01/05/97
-----						
US	5771275	A	23/06/98	AU	7740998 A	15/07/98
				WO	9827765 A	25/06/98

# PATENT COOPERATION TREATY

By Express Mail  
No. EL660968288US

From the:  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:  
BERGGREN OY AB  
P.O. Box 16  
FIN-00101 Helsinki  
FINLANDE

*Berggren Oy*

*24-02-2000*

*mm/ML*

## PCT

### WRITTEN OPINION

(PCT Rule 66)

Applicant's or agent's file reference <b>48178/ML/MM</b>		Date of mailing (day/month/year) <b>22.02.2000</b> <span style="float: right;"><i>20/5/2000</i></span>	
International application No. <b>PCT/FI99/00562</b>		REPLY DUE <b>within 3 month(s)</b> from the above date of mailing <span style="float: right;"><i>20/</i></span>	
International filing date (day/month/year) <b>24/06/1999</b>	Priority date (day/month/year) <b>24/06/1998</b>		
International Patent Classification (IPC) or both national classification and IPC <b>H04Q7/20</b>			
Applicant <b>NOKIA NETWORKS OY et al.</b>			

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain document cited
  - VII ☒ Certain defects in the international application
  - VIII ☒ Certain observations on the international application
3. The applicant is hereby **invited to reply** to this opinion.
 

**When?** See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

**How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

**Also:** For an additional opportunity to submit amendments, see Rule 66.4.  
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.  
For an informal communication with the examiner, see Rule 66.6.

**If no reply is filed,** the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: **24/10/2000.**

Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer / Examiner <b>Schweitzer, J-C</b>  Formalities officer (incl. extension of time limits) <b>Finnie, A</b> Telephone No. +49 89 2399 8251
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## WRITTEN OPINION

International application No. PCT/FI99/00562

### I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*);

#### Description, pages:

1-11 as originally filed

#### Claims, No.:

1-21 as originally filed

#### Drawings, sheets:

1/2-2/2 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

### V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

#### 1. Statement

Novelty (N)	Claims
Inventive step (IS)	Claims 1 - 21
Industrial applicability (IA)	Claims

#### 2. Citations and explanations

see separate sheet

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**



**Concerning section V.2 (reasoned statement under Rule 66.2(a)(ii) PCT)**

Methods for connecting a system comprising a subscriber apparatus, e.g a fixed (conventional) telephone set, to a mobile network, e.g. of the GSM type, using a "network element" as defined in present **claim 1** are arguably well-known in prior art and are actually to be found in any of the five documents cited in the search report.

In particular, such a method for interfacing a fixed telephone system and a mobile radio network is disclosed in citation **D1 = WO-A-97/34437 (Erickson)**, see page 3, line 10 to page 7, line 21, wherein a so-called WO-interface (124; Fig.1) is used to translate signals between the fixed telephone system and mobile network and to "connect signals" of the first system to the second network, and vice-versa. Thus, as in the alleged invention, said WO-interface permits to "*emulate towards*" the fixed telephone system or mobile network (see in this respect also section VIII below).

Therefore, considering that the core principle underlying the alleged invention, i.e. providing a separate element connected between two networks so as to permit an end user of the fixed telephone system to connect to a mobile radio network and to use functions which are normally not provided by its telephone set, is already known from said citation **D1**, claim 1 lacks an inventive step, contrary to Article 33(3) PCT.

Similar objections apply vis-a-vis the cited reference **D2 = WO-A-95/33348 (Erickson)**, which also describes an "interconnect function IWF" permitting to interface a mobile (GSM) network and other types of networks (fixed, DECT..). Thus, the subject-matter of claim 1 does not involve an inventive step over **D2**, either.

Independent **claim 14** defines a network element of the type set out in claim 1 permitting to "emulate" mobile network functions not found in the (fixed telephone) system. Said idea is also to be found in **D1** and **D2**, see passages noted above. Claim 14 is hence deficient in the same respect.

The dependent claims 2 to 13 and 15 to 21 appear to add nothing of inventive significance to claims 1 and 14, respectively, as the additional features introduced by said dependent claims refer only to minor implementing details which are known or directly derivable from the cited prior art references **D1** and **D2**, see below, or fall within the general knowledge or technical competence of a person skilled in the art.

The idea of storing subscriber data (as per claims 2 & 15) in the network element is to be taken from **D1**, see page 10, lines 23ff.

The features set out in claims 5 to 12 and 18 to 20 which relate to various types of networks and define possible interface arrangements are directly derivable from **D1** and/or **D2** (see Figs 1 to 5).

The features set out in the remaining dependent claims appear to fall within the common knowledge and technical competence of a skilled person in the field of mobile/fixed telephone systems or to relate to routine measures normally to be expected thereof and not combining to yield any unexpected or surprisingly advantageous result.

Thus, the dependent claims on file, either alone or in combination, appear to add nothing of inventive significance to the claims to which they are appended and, therefore, these claims cannot be considered to offer a basis for new patentable independent claims. As a consequence, no allowable combination of claims can be suggested by the examiner.

**Concerning section VII (form and contents).**

The independent claims should be drafted in the proper two-part "characterised" form recommended by Rule 6.3.(b),(i),(ii) PCT, having a preamble that correctly reflects the nearest prior art, presumably that represented by the above noted **D1**.

If any amended independent claims are filed, the opening part of the description including the summary of the invention should be brought into agreement with the wording thereof.

In order to meet the requirements of Rule 5.1.(a),(ii) PCT, the relevant prior art documents noted above should be acknowledged by reference and briefly discussed in the introductory part of the description.

The attention of the applicant is also drawn to the fact that the application may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed, Article 34(2)(b) PCT. Amendments should be filed by way of replacement pages in the manner stipulated by Rule 66.8(a) PCT. In particular, fair copies of the amendments should be filed preferably in triplicate. Moreover, the applicant's attention is drawn to the fact that, as a consequence of Rule 66.8(a) PCT the examiner is not permitted to carry out any amendments under the PCT procedure,

however minor these may be.

**Concerning section VIII (clarity).**

In claim 1, the expressions "*emulate towards said mobile network*" and "*emulate towards said system*" are not clear, contrary to Article 6 PCT. Actually, according to the description, mobile or fixed network functions associated with mobile/fixed terminals (communications devices) are emulated. Claim 1 should hence be clarified accordingly.

PCT

From the INTERNATIONAL BUREAU

**NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES**

(PCT Rule 47.1(c), first sentence)

To:

BERGGREN OY AB  
P.O. Box 16  
FIN-00101 Helsinki  
FINLANDE

*Berggren Oy Ab*

14 -01- 2000

Date of mailing (day/month/year) 29 December 1999 (29.12.99)		IMPORTANT NOTICE	
Applicant's or agent's file reference 48178			
International application No. PCT/FI99/00562	International filing date (day/month/year) 24 June 1999 (24.06.99)	Priority date (day/month/year) 24 June 1998 (24.06.98)	
Applicant NOKIA NETWORKS OY et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:  
AU,CN,EP,IL,JP,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CU,CZ,DE,DK,EA,EE,ES,FI,GB,GD,GE,GH,GM,HR,  
HU,ID,IN,IS,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MD,MG,MK,MN,MW,MX,NO,NZ,OA,PL,PT,RO,RU,  
SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on  
29 December 1999 (29.12.99) under No. WO 99/67960

**REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)**

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

**REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))**

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

## Continuation of Form PCT/IB/308

**NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF  
THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES**

<b>Date of mailing (day/month/year)</b> 29 December 1999 (29.12.99)	<b>IMPORTANT NOTICE</b>
<b>Applicant's or agent's file reference</b> 48178	<b>International application No.</b> PCT/FI99/00562
<p>The applicant is hereby notified that, at the time of establishment of this Notice, the time limit under Rule 46.1 for making amendments under Article 19 has not yet expired and the International Bureau had received neither such amendments nor a declaration that the applicant does not wish to make amendments.</p>	

The demand must be filed directly with the competent International Preliminary Examining Authority; if two or more Authorities are competent, with the one chosen by the applicant. The name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/

**PCT**

**CHAPTER II**

**DEMAND**

under Article 31 of the Patent Cooperation Treaty:  
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA		Date of receipt of DEMAND
<b>Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION</b>		Applicant's or agent's file reference 48178/ML/MM
International application No. PCT/FI99/00562	International filing date (day/month/year) 24 June 1999 (24.6.1999)	(Earliest) Priority date (day/month/year) 24 June 1998 (24.6.1998)
Title of invention Method and network element for connecting a subscriber to a mobile network		
<b>Box No. II APPLICANT(S)</b>		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  NOKIA NETWORKS OY P.O. Box 300, FIN-00045 NOKIA GROUP, Finland		Telephone No.:  Facsimile No.:  Teleprinter No.:
State (that is, country) of nationality: Finland	State (that is, country) of residence: Finland	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  HAMBERG, Max Lupajantie 1 A 2, FIN-00970 HELSINKI, Finland		
State (that is, country) of nationality: Finland	State (that is, country) of residence: Finland	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)          		
State (that is, country) of nationality:	State (that is, country) of residence:	
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.		



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**Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The following person is ☒ agent ☐ common representative  
 and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.  
☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.  
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

BERGGREN OY AB  
 P.O.Box 16, FIN-00101 HELSINKI, Finland

Telephone No.:

+358 9 693 701

Facsimile No.:

+358 9 693 3944

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:\***

1. The applicant wishes the international preliminary examination to start on the basis of:

☐ the international application as originally filed

the description

☐ as originally filed

☐ as amended under Article 34

the claims

☐ as originally filed

☐ as amended under Article 19 (together with any accompanying statement)

☐ as amended under Article 34

the drawings

☐ as originally filed

☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

\* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

☐ which is the language in which the international application was filed.

☒ which is the language of a translation furnished for the purposes of international search.

☒ which is the language of publication of the international application.

☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

**Box No. V ELECTION OF STATES**

The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

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## Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- |  |   |        |
|--|---|--------|
| 1. translation of international application                              | : | sheets |
| 2. amendments under Article 34   | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19  | : | sheets |
| 5. letter  | : | sheets |
| 6. other ( <i>specify</i> )  | : | sheets |

For International Preliminary  
Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- |  |   |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet                             | 4. <input type="checkbox"/> statement explaining lack of signature                                  |
| 2. <input type="checkbox"/> separate signed power of attorney                            | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input type="checkbox"/> other ( <i>specify</i> ):   |

## Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

BERGGREN OY AB



Markus Levlin  
Patent Agent

5 January 2000

## For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

## For International Bureau use only

Demand received from IPEA on:

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## PCT

## FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">International application No.</td> <td>PCT/FI99/00562</td> </tr> <tr> <td>Applicant's or agent's file reference</td> <td>48178/ML/MM</td> </tr> </table>	International application No.	PCT/FI99/00562	Applicant's or agent's file reference	48178/ML/MM	<p>For International Preliminary Examining Authority use only</p>  <p>Date stamp of the IPEA</p>												
International application No.	PCT/FI99/00562																
Applicant's or agent's file reference	48178/ML/MM																
<p>Applicant</p> <p style="text-align: center;">NOKIA NETWORKS OY</p>																	
<p><b>Calculation of prescribed fees</b></p> <table style="width: 100%;"> <tr> <td style="width: 50%;">1. Preliminary examination fee .....</td> <td style="width: 20%; text-align: center;">EUR 1533</td> <td style="width: 10%; text-align: center;">P</td> <td style="width: 20%;"></td> </tr> <tr> <td>2. Handling fee <i>(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)</i> .....</td> <td style="text-align: center;">EUR 147</td> <td style="text-align: center;">H</td> <td></td> </tr> <tr> <td>3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box .....</td> <td style="text-align: center;">EUR 1680</td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">TOTAL</td> <td></td> <td></td> </tr> </table>		1. Preliminary examination fee .....	EUR 1533	P		2. Handling fee <i>(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)</i> .....	EUR 147	H		3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box .....	EUR 1680				TOTAL		
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3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box .....	EUR 1680																
	TOTAL																
<p><b>Mode of Payment</b></p> <table style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)  <input type="checkbox"/> cheque  <input type="checkbox"/> postal money order  <input type="checkbox"/> bank draft </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> cash  <input type="checkbox"/> revenue stamps  <input type="checkbox"/> coupons  <input checked="" type="checkbox"/> other (specify):  Bank transfer to account  200118-182076 </td> </tr> </table>		<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below) <input type="checkbox"/> cheque <input type="checkbox"/> postal money order <input type="checkbox"/> bank draft	<input type="checkbox"/> cash <input type="checkbox"/> revenue stamps <input type="checkbox"/> coupons <input checked="" type="checkbox"/> other (specify): Bank transfer to account 200118-182076														
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<p><b>Deposit Account Authorization</b> <i>(this mode of payment may not be available at all IPEAs)</i></p> <p>The IPEA/ _____ <input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.</p> <p><input type="checkbox"/> <i>(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)</i> is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.</p> <table style="width: 100%;"> <tr> <td style="width: 33%;">Deposit Account Number _____</td> <td style="width: 33%;">Date (day/month/year) _____</td> <td style="width: 33%;">Signature _____</td> </tr> </table>		Deposit Account Number _____	Date (day/month/year) _____	Signature _____													
Deposit Account Number _____	Date (day/month/year) _____	Signature _____															

PATENT COOPERATION TREATY

*Berggren Oy Ab*

27 -09- 2000

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

BERGGREN OY AB  
P.O. Box 16  
FIN-00101 Helsinki  
FINLANDE

PCT

*mm*

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT  
(PCT Rule 71.1)

Date of mailing  
(day/month/year) 25.09.2000

Applicant's or agent's file reference  
48178/ML/MM

IMPORTANT NOTIFICATION

International application No.  
PCT/FI99/00562

International filing date (day/month/year)  
24/06/1999

Priority date (day/month/year)  
24/06/1998

Applicant  
NOKIA NETWORKS OY et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/

 European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0 Tx: 523656 epmu d  
Fax: +49 89 2399 - 4465

Authorized officer

Finnie, A  
Tel. +49 89 2399-8251



# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>48178/ML/MM</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/FI99/00562</b>	International filing date (day/month/year) <b>24/06/1999</b>	Priority date (day/month/year) <b>24/06/1998</b>
International Patent Classification (IPC) or national classification and IPC <b>H04Q7/20</b>		
Applicant <b>NOKIA NETWORKS OY et al.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand <b>05/01/2000</b>	Date of completion of this report <b>25.09.2000</b>
Name and mailing address of the international preliminary examining authority:  <b>European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465</b>	Authorized officer <b>Schweitzer, J-C</b>  Telephone No. <b>+49 89 2399 8963</b> 



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/FI99/00562

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-11 as originally filed

**Claims, No.:**

1-20 as received on 25/05/2000 with letter of 22/05/2000

**Drawings, sheets:**

1/2,2/2 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI99/00562

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims	1 - 20
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1 - 20
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1 - 20
	No:	Claims	

### 2. Citations and explanations

see separate sheet

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/FI99/00562

**Concerning section V.2 (reasoned statement under Article 35(2) PCT)**

**Claim 1** (to be clarified as indicated in section VIII below) relates to a method for connecting a telephone system comprising a subscriber apparatus, e.g. a fixed (conventional) telephone set, to a mobile network, e.g. of the GSM type, using a network element which stores information corresponding to information in a subscriber identity module (SIM) of a mobile terminal. Based on said stored information, the claimed method emulates towards said telephone system or mobile network the desired interfaces of said system and network, respectively, and connects signals of said system to said mobile radio network, and vice-versa. In this way, a subscriber can transfer the subscriber information, i.e. his identity, from his mobile telephone to the network element to which a fixed terminal is attached, whereby the fixed terminal (such as an old rotary switch telephone) functions as a replacement for his mobile phone, all functions required by the fixed terminal being realized by the network element.

Such a method allowing to emulating the functionality of a terminal based on the information of a SIM card by the addition of a single network element into a radio access network, as claimed, is neither taught, nor rendered obvious, alone or in combination, by the prior art documents acknowledged in the description or cited in the International Search Report. The nearest prior art is given by the cited reference **WO-A-97/34437 (Ericsson)**, which teaches a method for interfacing a fixed telephone system and a mobile radio network using a so-called WO-interface which translates signals between the fixed telephone system and mobile network and connects signals therebetween, without however emulating a SIM card.

Claim 1 is therefore novel and considered to involve the required inventive step, Articles 33(2) and (3) PCT. The subject-matter of claim 1 is also industrially applicable.

The same applies to independent **claim 13**, which is directed to a network element permitting to carry out the method defined in claim 1. Claim 13, therefore, equally meets all the requirements of Article 33 PCT.

Dependent claims 2 to 12 and 14 to 20 relate to further implementing details of the method and network element defined by the independent claims 1 and 13, respectively, and are thus equally novel, inventive and industrially applicable.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/FI99/00562

**Concerning section VII (form and contents).**

In order to meet the requirements of Rule 5.1.(a),(ii) PCT, the relevant prior art document **WO-A-97/34437** noted above should have been acknowledged by reference and briefly discussed in the introductory part of the description.

**Concerning section VIII (clarity).**

In claim 1, the expressions "emulating towards said mobile network a desired interface" and "emulating towards said system a desired interface" are not fully clear, contrary to Article 6 PCT. Actually, according to the description, mobile or fixed network functions associated with mobile communications devices or fixed terminals are emulated.

In addition, it is not clear from the present wording that these functions are emulated in dependence on the stored SIM information, as no link between the claimed step of storing information and the steps of emulating/connecting is presently given in claim 1. As the principle of emulating the functionality of a terminal based on the stored subscriber information is considered to be essential for the understanding and the correct operation of the invention, it should also be clearly defined in claim 1, so as to meet the requirement following from Article 6 PCT taken in combination with Rule 6(3)(b) PCT, that any independent claim must contain all the technical features essential to the invention.

The same objections essentially apply to apparatus claim 13.

## Claims

1. A method for connecting a system comprising subscriber apparatus to a mobile network, **characterized** in that the method comprises the steps of
  - storing in a network element (11) connected to the mobile network subscriber
  - 5 information corresponding to information in a subscriber identity module of a mobile communication means of the mobile network,
  - emulating towards said mobile network a desired interface of said mobile network,
  - emulating towards said system a desired interface of said system, and
  - connecting signals of said system to the mobile network and signals of the mobile
  - 10 network to said system.
2. A method according to claim 1, **characterized** in that said network element (11) is used to emulate mobile network functions associated with mobile communication devices of the mobile network that are not realized by the subscriber apparatus in said system.
- 15 3. A method according to claim 2, **characterized** in that at least a part of said functions are functions dependent on subscriber information.
4. A method according to claim 1, **characterized** in that the network element is used to receive signals from said system, which signals are coming from signal lines of which there are a certain first number, and received signals are concentrated into
- 20 signal lines of the mobile network of which there are a certain second number such that said second number is smaller than said first number.
5. A method according to claim 1, **characterized** in that said interface is an interface between a base station controller and mobile switching center.
6. A method according to claim 1, **characterized** in that said interface is an
- 25 interface between a base station controller and base station.
7. A method according to claim 1, **characterized** in that said interface is a radio

interface between a mobile communication device and base station.

8. A method according to claim 1, **characterized** in that at least part of the mobile network subscriber data needed by the network element (11) is read from a database (15) stored in the network element.
- 5 9. A method according to claim 1, **characterized** in that at least part of the mobile network subscriber data needed by the network element (11) is generated automatically.
10. A method according to claim 1, **characterized** in that said system comprises at least one fixed telephone network.
- 10 11. A method according to claim 1, **characterized** in that said system comprises at least one radio network (41).
12. A method according to claim 1, **characterized** in that said system comprises at least one interphone network (51).
13. A network element (11), **characterized** in that it is adapted so as to be connected to a mobile network in order to connect a system with subscriber apparatus to the mobile network through said network element, and that it comprises
- 15 - memory means for storing subscriber information corresponding to information in a subscriber identity module of a mobile communication means of the mobile network,
- 20 - an emulation block for emulating mobile network functions not found in said system, and
- a switching block for connecting signals coming from said system to the mobile network.
14. A network element according to claim 13, **characterized** in that said emulation block is arranged so as to emulate mobile network functions associated with
- 25

mobile communication devices of the mobile network which are not provided by said subscriber apparatus in said system.

15. A network element according to claim 13, **characterized** in that it comprises in addition to the emulation block an output unit (13) for realizing functionality according to a predetermined interface of said mobile network.
16. A network element according to claim 15, **characterized** in that said interface is an interface between a base station controller and mobile switching center.
17. A network element according to claim 15, **characterized** in that said interface is an interface between a base station and base station controller.
18. A network element according to claim 15, **characterized** in that said interface is an interface between a mobile communication device and base station.
19. A network element according to claim 12, **characterized** in that it further comprises a database block (15) for storing mobile network subscription data corresponding to subscriber apparatus in said system.
20. A network element according to claim 12, **characterized** in that it further comprises in said memory means subscriber information corresponding to information in a subscriber identity module of a mobile communication means of the mobile network.

AMENDED SHEET

PCT REQUEST

48178

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IV-1	<b>Agent or common representative; or address for correspondence</b> The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name	BERGGREN OY AB
IV-1-2	Address:	P.O. Box 16 FIN-00101 Helsinki Finland
IV-1-3	Telephone No.	+358-9-693701
IV-1-4	Facsimile No.	+358-9-6933944
IV-1-5	e-mail	email.box@berggren.elisa.fi
V	<b>Designation of States</b>	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW SD SZ UG ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT
V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AL AM AT AU AZ BA BB BG BR BY CA CH&LI CN CU CZ DE DK EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG US UZ VN YU ZA ZW
V-5	<b>Precautionary Designation Statement</b> In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.	



## PCT REQUEST

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V-6	Exclusion(s) from precautionary designations	NONE	
VI-1	Priority claim of earlier national application		
VI-1-1	Filing date	24 June 1998 (24.06.1998)	
VI-1-2	Number	981450	
VI-1-3	Country	FI	
VI-2	Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1	
VII-1	International Searching Authority Chosen	Swedish Patent Office (ISA/SE)	
VIII	Check list	number of sheets	electronic file(s) attached
VIII-1	Request	4	-
VIII-2	Description	11	-
VIII-3	Claims	3	-
VIII-4	Abstract	1	48178.txt
VIII-5	Drawings	4	-
VIII-7	TOTAL	23	
VIII-8	Accompanying items	paper document(s) attached	electronic file(s) attached
VIII-8	Fee calculation sheet	✓	-
VIII-9	Separate signed power of attorney	✓	-
VIII-10	Copy of general power of attorney	✓	-
VIII-16	PCT-EASY diskette	-	diskette
VIII-17	Other (specified):	Copy of Official Action in 981450	-
VIII-18	Figure of the drawings which should accompany the abstract	2	
VIII-19	Language of filing of the international application	Finnish	
IX-1	Signature of applicant or agent		
IX-1-1	Name	BERGGREN OY AB	
IX-1-2	Name of signatory	Markus Levlin	
IX-1-3	Capacity	Patent Agent	

## FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	

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10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/SE
10-6	Transmittal of search copy delayed until search fee is paid	

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11-1	Date of receipt of the record copy by the International Bureau	
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## PCT REQUEST

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0	For receiving Office use only	
0-1	International Application No.	PCT/FI 99 / 0 0 5 6 2
0-2	International Filing Date	24 JUN 1999 ( 24. 06. 99 )
0-3	Name of receiving Office and "PCT International Application"	The Finnish Patent Office PCT International Application
0-4	Form - PCT/RO/101 PCT Request Prepared using	PCT-EASY Version 2.84 (updated 01.04.1999)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	National Board of Patents and Registration (Finland) (RO/FI)
0-7	Applicant's or agent's file reference	48178
I	Title of invention	METHOD AND NETWORK ELEMENT FOR CONNECTING A SUBSCRIBER TO A CELLULAR TELECOMMUNICATIONS NETWORK
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
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III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant and inventor
III-1-2	Applicant for	US only
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III-1-5	Address:	Lupajantie 1 A 2 FIN-00970 Helsinki Finland
III-1-6	State of nationality	FI
III-1-7	State of residence	FI

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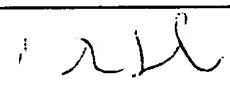
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IX-1	Signature of applicant or agent		
IX-1-1	Name	BERGGREN OY AB	
IX-1-2	Name of signatory	Markus Levlin	
IX-1-3	Capacity	Patent Agent	

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10-2-1	Received		
10-2-2	Not received		
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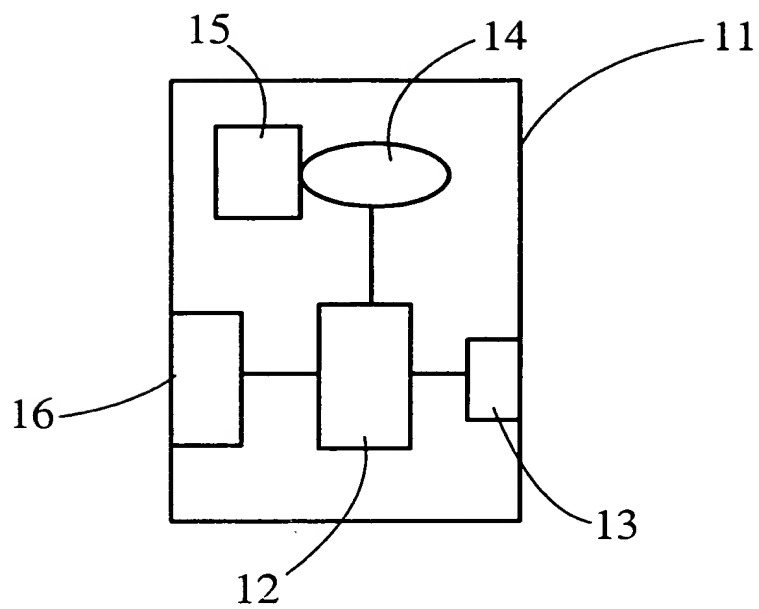
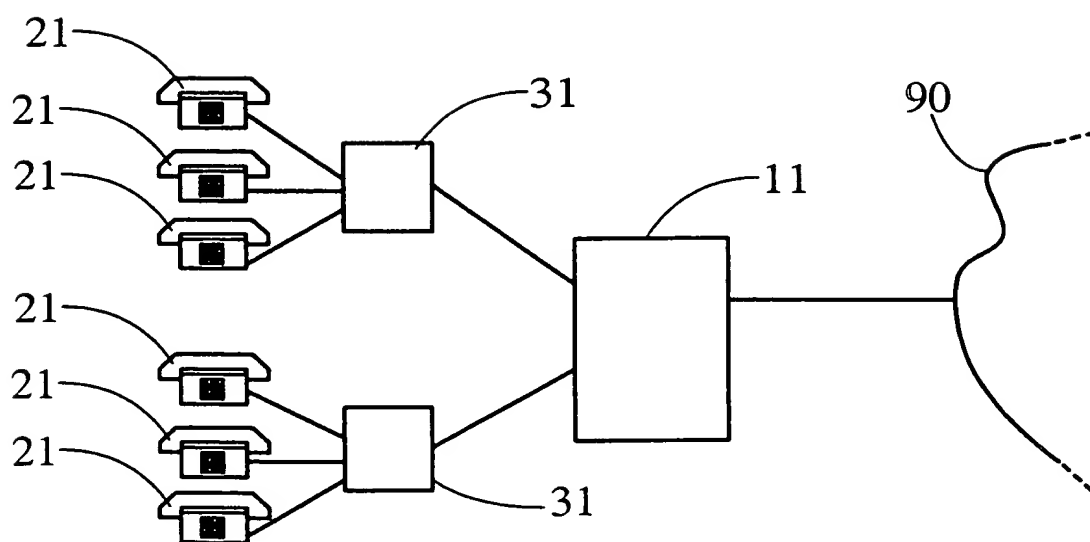
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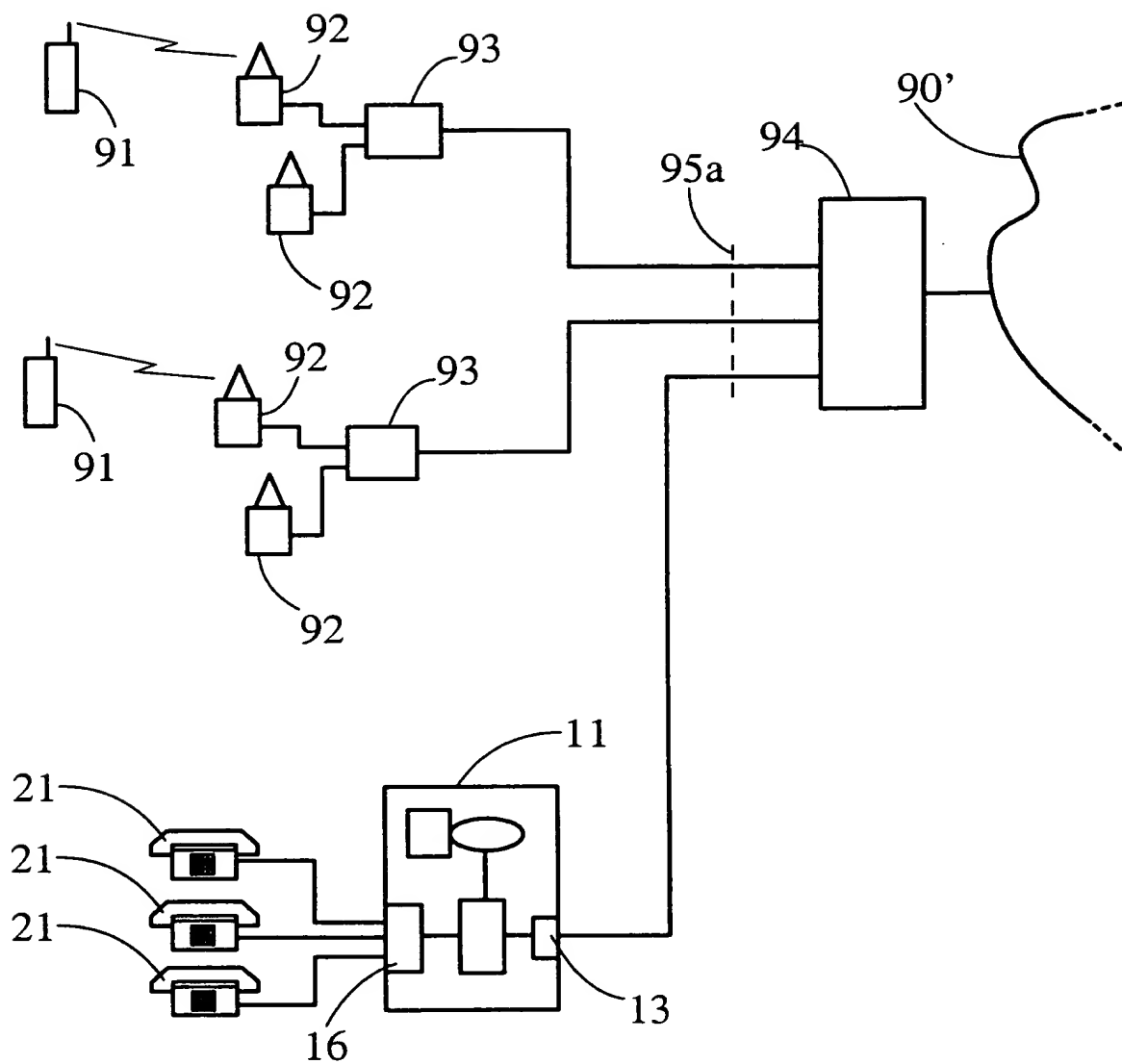
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10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	<b>ISA/SE</b>
10-6	Transmittal of search copy delayed until search fee is paid	

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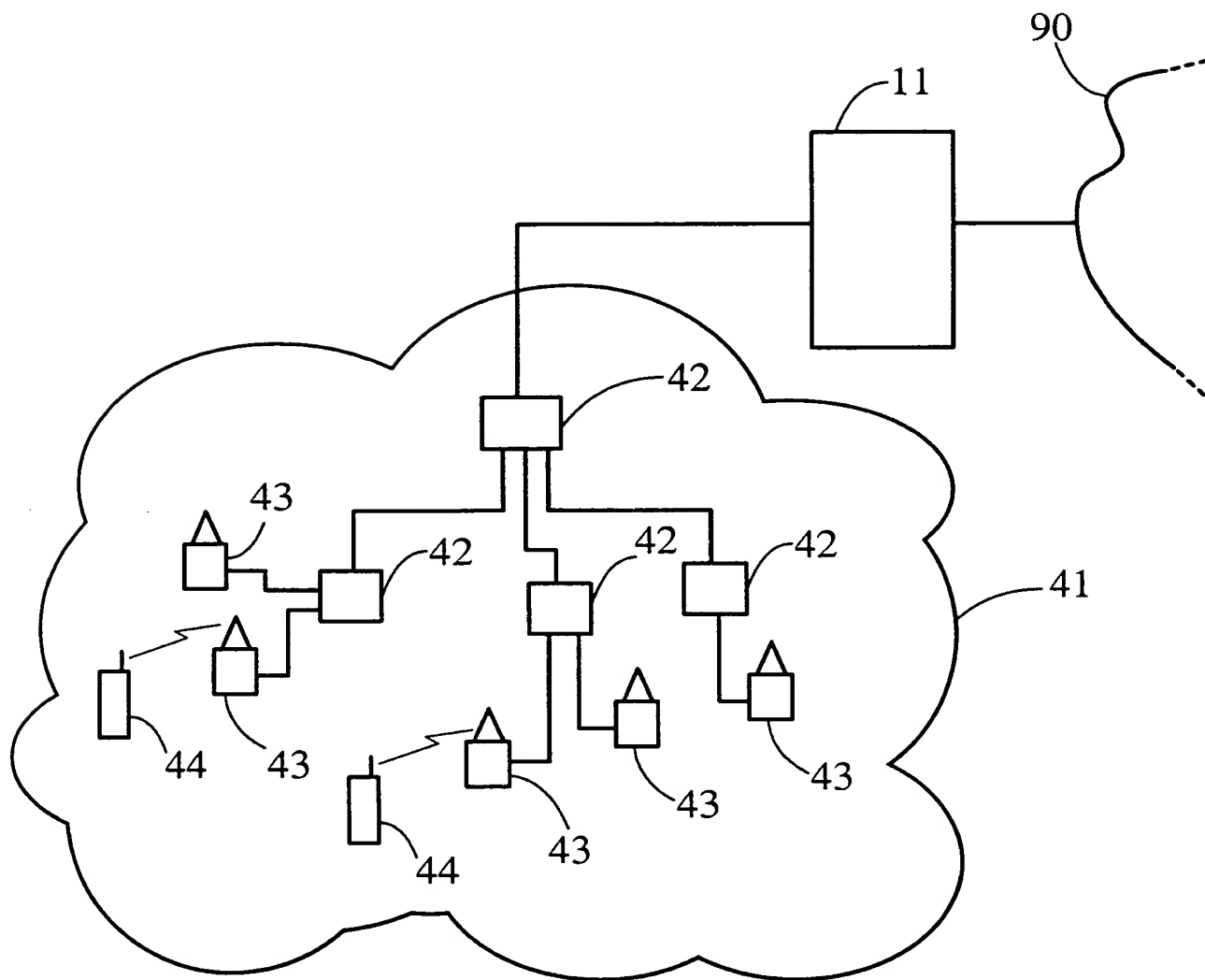
11-1	Date of receipt of the record copy by the International Bureau	<b>0 3 AUGUST 1999 ( 0 3. 08. 99 )</b>
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**Fig. 1****Fig. 3**

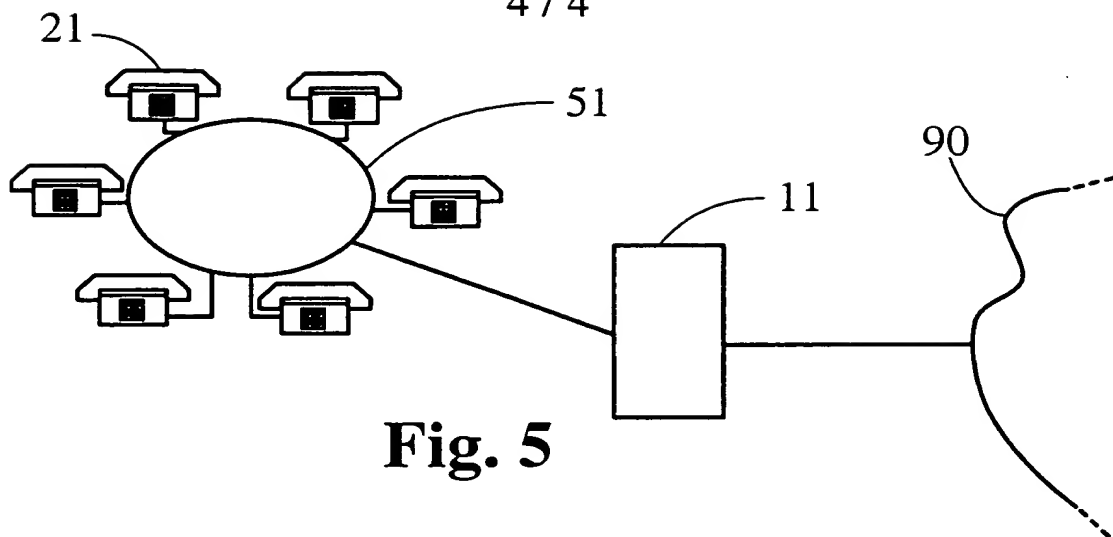
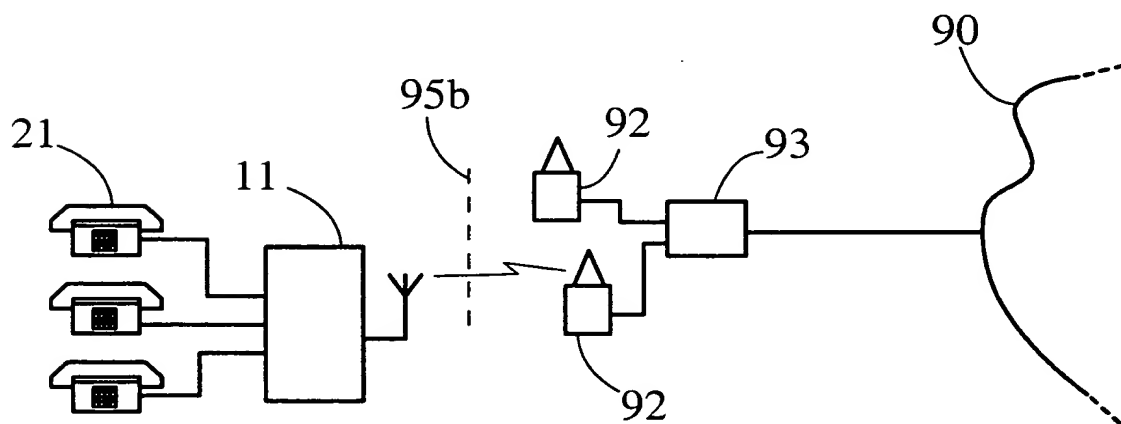
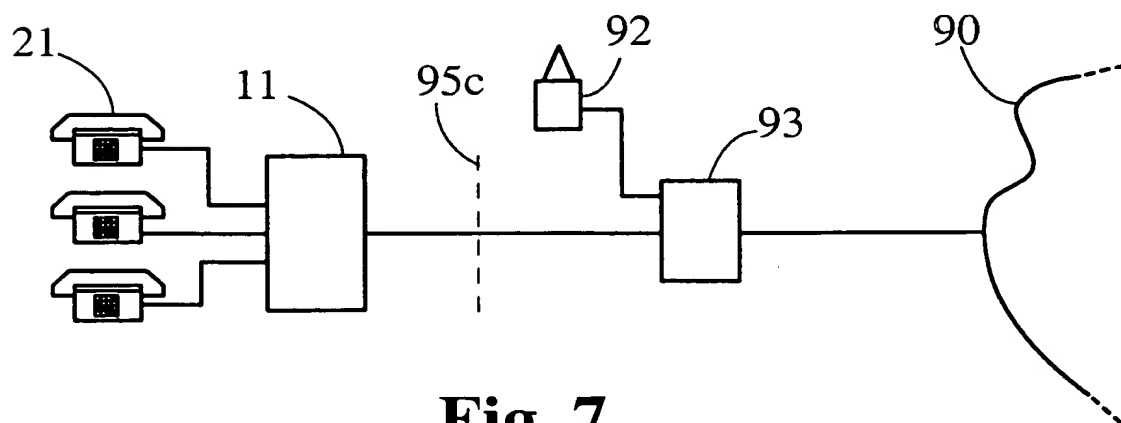
**Fig. 2**



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**Fig. 4**

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**Fig. 5****Fig. 6****Fig. 7**

## Menetelmä ja verkkoelementti tilaajan liittämiseksi matkaviestinverkkoon

5 Keksintö liittyy menetelmään ja verkkoelementtiin, jolla matkaviestinverkkoon voidaan liittää tilaajalaitteita, kuten esim. tavallisia kiinteän puhelinverkon tilaajalaitteita. Keksintöä voidaan soveltaa edullisesti esim. GSM-verkossa.

10 Eräs tekniikan tason mukainen ratkaisu esitetään patentissa EP-779 757. Kyseisessä julkaisussa on esitetty ratkaisu, jolla kiinteän puhelinverkon käyttäjille tarjotaan ratkaisua, jolla kiinteän tilaajalaitteen käyttäjät voivat saada samat tilaajatoiminteet kuin matkaviestinverkon käyttäjät. Patentissa on esitetty menetelmä, jossa kiinteään tilaajalaitteeseen voidaan asettaa SIM-kortti. SIM-kortin avulla kiinteä tilaajalaite voidaan liittää matkaviestinverkkoon, jolloin tilaajan tilaajatiedot voidaan tallentaa vierailijarekisteriin.

15 Edellä mainitussa EP-patentissa 779 757 esitetyssä keksinnössä on kuitenkin omat haittapuolensa. EP-patentissa 779 757 esitetyn keksinnön mukaisessa ratkaisussa käyttäjä joutuu hankkimaan uuden tilaajalaitteen matkaviestinverkon palvelujen saamiseksi. Tämä johtuu siitä, että matkaviestinverkon palvelujen saaminen perustuu tässä keksinnössä SIM-kortin olemassaoloon tilaajalaitteessa. Uusien tilaajalaitteiden hankintahinta tulee suoraan loppukäyttäjän maksettavaksi. Edelleen edellä mainitussa julkaisussa esitetty ratkaisu mahdollistaa ainoastaan kiinteiden tilaajalaitteiden lisäämisen matkaviestinverkkoon.

25 Tämän keksinnön tavoitteena on mahdollistaa erilaisten tilaajalaitteiden kuten tavanomaisten puhelinten liittäminen matkaviestinverkkoon. Tämän keksinnön tavoitteena on myös mahdollistaa kiinteiden puhelinverkkojen liittäminen matkaviestinverkkoon. Lisäksi tämän keksinnön tavoitteena on mahdollistaa isäntäverkkona toimivasta matkaviestinverkosta poikkeavien radioliikenneverkkojen liittäminen matkaviestinverkkoon.

30 Keksinnön tavoitteet saavutetaan erillisellä matkaviestinverkkoon liitettyllä verkkoelementillä, johon isäntäverkkoon liitettävä tilaajalaite, puhelinverkko tai muu kokonaisuus liitetään. Isäntäverkon suuntaan verkkoelementti emuloi haluttua isäntäverkon rajapintaa tai laitetta, ja isäntäverkkoon liitettävän tilaajalaitteen tai verkon suuntaan tilaajalaitteen tarvitsemaa palvelukokonaisuutta tai rajapintaa. Verkkoelementti käsittää edullisesti muistielimen, johon on tallennettu eri suuntiin tapahtuvaan emulointiin mahdollisesti tarvittavat lisätiedot.

Keksinnön mukaiselle menetelmälle on tunnusomaista se, mitä on esitetty menetelmään kohdistuvassa itsenäisessä patenttivaatimuksessa. Keksinnön mukaiselle verkkoelementille on tunnusomaista se, mitä on esitetty itsenäisessä verkkoelementtiin kohdistuvassa patenttivaatimuksessa. Muita keksinnön edullisia toteutusmuotoja on esitetty epäitsenäisissä patenttivaatimuksissa.

Erillisen matkaviestinverkkoon liitetyn verkkoelementin avulla voidaan jonkin tilaajaverkon, kuten kiinteän puhelinverkon, käyttäjille tarjota kyseisen tilaajaverkon palvelut matkaviestinverkon kautta. Verkkoelementin tehtävänä on keksinnön eräissä edullisissa toteutusmuodossa toimia siten, että tilaajaverkko tai tilaajaverkon tilaajalaite näyttää matkaviestinverkolle halutulta matkaviestinverkkoon kuuluvalta elimeltä tai usealta halutulta elimeltä. Verkkoelementin toiminta on saatu aikaan siten, että verkkoelementissä emuloidaan ainakin yhtä matkaviestinverkon elintä matkaviestinverkon suuntaan. Vastaavasti tilaajalaitteen suuntaan emuloidaan kulloinkin kyseessä olevaa tilaajaverkkoa ja tuotetaan näin tilaajaverkolle tyypilliset signaalit.

Keksinnön eräänä etuna on se, että keksinnön mukaisen verkkoelementin avulla pystytään haluttu yksittäinen verkko liittämään matkaviestinverkkoon. Eräs tällainen verkko voi olla esim. sisäpuhelinverkko. Erityisen edullinen ratkaisu saadaan aikaan haja-asutusalueiden tapauksessa, jolloin jokin asutuskeskittymä voidaan edullisesti liittää kiinteään puhelinverkkoon matkaviestinverkon kautta. Säästöä tulee ensinnäkin siitä, että haja-asutusalueelle ei tarvitse tuoda kiinteää puhelinverkkoa pitkien matkojen takaa vaan puhelujen välittäminen voidaan hoitaa radioaaltojen välityksellä. Käyttäjälle säästöä syntyy siitä, että nykyisin kaupasta saatavat edulliset tilaajalaitteet, kuten tavanomaiset puhelimet, soveltuvat erittäin hyvin käytettäväksi verkkoelementin yhteydessä. Lisäksi, jos verrataan verkkoelementin ja mahdollisen kiinteän tilaajalaitteen hankintakustannuksia matkaviestimen hankintakustannukseen verrattuna, voidaan todeta, että verkkoelementin ja kiinteän tilaajalaitteen kustannukset ovat alhaisemmat niissä käytettävän melko yksinkertaisen tekniikan vuoksi. Etenkin, jos verkkoelementti ostetaan esim. jonkin asumiskeskittymän yhteisenä hankintana, saadaan puhelinyhteys järjestettyä hyvinkin edullisesti. Edellä esitetty soveltuu myös muihin verkkoihin kuin kiinteään puhelinverkkoon.

Keksinnön eräänä toisena etuna voidaan pitää sitä, että tällaisella verkkoelementillä pystytään säästämään resursseja. Tietyn alueen puhelinverkon resurssit tarvitsee esim. kiinteän verkon tapauksessa mitoittaa kaikkien alueella käytössä olevien kiinteiden tilaajalaitteiden mukaan. Vastaavasti samalla alueella olevan matkaviestin-

- verkon resurssit tarvitsee mitoittaa kaikkien alueella olevien ja sinne mahdollisesti tulevien matkaviestimien mukaan. Keksinnön erään edullisen toteutusmuodon mukaisen verkkoelementin avulla voidaan yhdistää sekä kiinteän puhelinverkon että matkaviestinverkon palvelut, jolloin kokonaiskapasiteetti tietyn alueen puhelinkeskukseksi voidaan mitoittaa näiden yhteistarpeen mukaisesti, joka on tunnetusti pienempi kuin erillisille verkoille tarvittavien kapasiteettien summa. Tämä on yleistettävissä kaikille muillekin erillisille puhelinverkoille, joissa verkkoelementtiä voidaan käyttää.
- 10 Keksinnön eräänä kolmantena etuna voidaan pitää sitä, että keksinnön mukaisella laitteella käyttäjälle voidaan kiinteän puhelinverkon tapauksessa tarjota tuttu ja turvallinen kiinteän tilaajalaitteen liityntä. Huolimatta matkaviestinten tuotekehityksestä käyttäjäystävällisempään suuntaan, yhä vieläkin löytyy ihmisiä, joille matkaviestin on pelottava ja vaikea laite, jota ei uskalleta tai osata käyttää. Erityisesti vanhempien ihmisten keskuudessa matkaviestintä pidetään liian hankalana käyttää.
- 15 Syiksi ihmiset sanovat muun muassa liian suuren näppäinmäärän sekä kooltaan liian pienet näppäimet. Ihmiset toivovatkin, että he voisivat käyttää tuttua kiinteää puhelintaan joka paikassa, esim. kesäasunnollaan, ja juuri tähän toiveeseen tässä esitetty keksintö tuo hyvän ratkaisun.
- 20 Matkaviestinoperaattorin kannalta verkkoelementti tuo uusia mahdollisuuksia tarjota palveluita. Nykyisin matkaviestintoimintoihin keskittynyt operaattori pystyy tarjoamaan vain matkaviestinliittymän ja siihen liittyviä palveluita asiakkaalle. Uuden verkkoelementin avulla operaattori voi markkinoida myös yksinkertaisia ja tavallisia lankaliittymiä sekä myös muita liittymiä ja niiden erilaisia palveluita. Tällöin markkinoille syntyy kilpailua myös erilaisten liittymien tarjonnasta ja tarjoajista, mikä on useimmiten hyvä asia asiakkaan kannalta.
- 25 Edelleen operaattori voi tarjota asiakkaalle puhelinnumeron, joka näyttää kiinteän liittymän puhelinnumerolta. Tällöin asiakkaan liittymä näyttää sekä ulkoisesti että puhelinnumeronsa kannalta tavalliselta kiinteän puhelinverkon liittymältä. Kiinteän liittymän kaltaisen puhelinnumeron avulla voidaan poistaa monia ihmisiä vaivaava pelko matkaviestimeen soitosta ja soiton kalleudesta. Operaattori voi esim. tehdä sopimuksen paikallisen puhelinyhtiön kanssa kiinteitä liittymänumeroita muistuttavien puhelinnumeroiden käytöstä verkkoelementtiin liitetyissä tilaajalaitteissa tai
- 35 muulla tavoin järjestää kyseiselle alueelle tyypillisten puhelinnumeroiden käytön.

- Keksinnön mukainen verkkoelementti mahdollistaa käyttäjän tilaajaidentiteetin siirtämisen matkaviestimestä verkkoelementtiin, jolloin verkkoelementtiin liitetty tilaajalaite toimii käyttäjän päätelaitteena. Käyttäjä voi myös siirtää tilaajaidentiteetin päinvastaiseen suuntaan eli siirtää tilaajalaitetta vastaavat tilaajatiedot SIM-kortille, ja jatkaa liittymän käyttöä matkaviestimen avulla. Siten keksinnön mukainen verkkoelementti mahdollistaa liikkuvuuden lisäämisen kiinteisiin puhelinverkkoihin ja sijainnin päivityksen kiinteästä päätelaitteesta matkaviestimeen ja päinvastoin sekä kiinteästä päätelaitteesta toiseen kiinteään päätelaitteeseen.
- 10 Keksinnön mukaisen verkkoelementin avulla voidaan kiinteän tilaajalaitteen käyttäjälle tarjota kaikki modernin digitaalisen lankaverkon palvelut. Nykyisin tilanne on se, että digitaalisia lankaverkkoja on tyypillisesti vain suurissa kaupungeissa. Verkkoelementin avulla kaikki nämä palvelut voidaan tarjota myös haja-asutusalueella asuville. Digitaalisen lankaverkon tyypillisiä mahdollisia palveluja ovat esim. soitonsiirtopalvelu ja puhelinvastaajapalvelun. Myös muita palveluja on olemassa. Lisäksi, kun huomioidaan se, että verkkoelementti käyttää matkaviestinverkkoa, on verkkoelementin käyttäjälle mahdollista tarjota kaikkia matkaviestinverkon palveluita, joita on mahdollista ohjata kiinteän tilaajalaitteen numeronäppäimillä.
- 20 Seuraavassa selostetaan keksintöä yksityiskohtaisemmin viitaten esimerkkeinä esitettyihin edullisiin suoritusmuotoihin ja oheisiin kuviin, joissa
- kuva 1 esittää erästä keksinnön mukaista suoritusmuotoa verkkoelementistä,
- kuva 2 esittää erään keksinnön mukaisen verkkoelementin suoritusmuodon, jossa verkkoelementin tulopuolelle on liitetty tavallisia kiinteitä tilaajalaitteita,
- 25 kuva 3 esittää erään keksinnön mukaisen verkkoelementin suoritusmuodon, jossa verkkoelementin tulopuolelle on liitetty kiinteän puhelinverkon puhelinkeskuksia,
- 30 kuva 4 esittää erään keksinnön mukaisen verkkoelementin suoritusmuodon, jossa tulopuolelle on liitetty eräs radioverkko,
- kuva 5 esittää erään keksinnön mukaisen verkkoelementin suoritusmuodon, jossa tulopuolelle on liitetty jokin sisäpuhelinverkko,
- kuva 6 esittää erään keksinnön mukaisen verkkoelementin sijoittumisen matkaviestinverkkoon, jossa verkkoelementti emuloi radiorajapintaa, ja
- 35 kuva 7 esittää erään keksinnön mukaisen verkkoelementin sijoittumisen matkaviestinverkkoon, jossa verkkoelementti emuloi tukiaseman ja tukiasemaohjaimen välistä rajapintaa.

Kuvissa käytetään toisistaan vastaavista osista samoja viitenumeroita ja -merkintöjä.

- Kuvassa 1 on esitetty keksinnön mukaisen verkkoelementin 11 eräs suoritusmuoto. Kyseinen verkkoelementti 11 voidaan sijoittaa edullisesti esim. kahden erilaisen verkon, kuten matkaviestinverkon ja kiinteän puhelinverkon väliin toteuttamaan sopivaa rajapintaa kullekin verkolle. Emulointi voi olla toteutettu edullisesti esim. mikroprosessorin 14 avulla, joka on ohjelmoitu tuottamaan ainakin tarvittavat signaalit kullekin verkolle, jotka verkkoelementtiin 11 on yhdistetty.
- 10 Verkkoelementti 11 voi käsittää emulointilohkon, kuten mikroprosessorin 14, lisäksi kytkentälohkon 12 kuten esim. kytkentäkenttäpiirin 12, tuloyksikön 16 ja lähtöyksikön 13. Tuloyksikön 16 tehtävänä on toteuttaa verkkoelementin tulopuolelle tarvittava liitäntä tai tarvittavat liitännät, ja vastaavasti lähtöyksikön 13 tehtävänä on toteuttaa verkkoelementin lähtöpuolelle tarvittava liitäntä tai tarvittavat liitännät.
- 15 Esim., keksinnön eräässä toteutusmuodossa tuloyksikkö voi käsittää yhden tai useamman analogisen puhelinlinjan liitäntäkortin (LIA, Line Interface Analogue). Kytkentäkenttäpiirin 12 tehtävänä on edullisesti ainakin kytkeä puhesignaaleja puheluiden välittämiseksi. Kytkemisellä voidaan tässä myös tarkoittaa sitä, että vaikka esim. verkkoelementin 11 tuloyksikköön 16 voi olla kytketty suurikin määrä tilaajalaitteita, pystyy verkkoelementti 11 kytkemään puhelut jotakin tunnettua tekniikkaa hyväksi käyttäen lähtöyksikön 13 ulosmenoihin eli lähtöyksikköön kytkettyihin matkaviestinverkon signaalilinjoihin, joita voi olla vähemmän kuin tulopuolen sisäänmenoja eli matkaviestinverkkoon liitettävän järjestelmän signaalilinjoihin. Tässä matkaviestinverkon signaalilinjat voivat olla esim. matkaviestinverkon puhekanavia.
- 20 Tulopuolella tarkoitetaan tässä verkkoelementin 11 sitä puolta, jota ei ole kytketty isäntaverkkoon ja lähtöpuolella vastaavasti isäntaverkkoon kytkettyä puolta. Verkkoelementti voi siten kytkentätoimintojen lisäksi tai ohella käsittää myös keskittämistoimintoja.
- 25 Tässä selostuksessa isäntaverkolla tarkoitetaan matkaviestinverkkoa tai sen osaa, kuten runkoverkkoa (CN, core network), johon liitettävä, tyypillisesti matkaviestinverkkoa pienempi kokonaisuus halutaan verkkoelementin 11 avulla liittää.
- 30 Edellä mainittujen komponenttien lisäksi verkkoelementti 11 voi käsittää ainakin tietokantalohkon 15 tietokannan toteuttamiseksi jonka tietokannan avulla verkkoelementtiin 11 kytketty tilaajalaite voidaan edullisesti tunnistaa. Esimerkiksi jos isäntaverkkona on GSM-verkko, SIM-kortin tietoja vastaavat tilaajatiedot eli isäntäverkon tilaajatietoja vastaavat tiedot tai ainakin osa niistä voidaan tallentaa kysei-
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seen tietokantaan tai muistielimeen 15. Tietokanta 15 voi olla tallennettuna esim. muistipiiriin tai muuhun muistielimeen. Tietokantaa voidaan edullisimmin käyttää sellaisten isäntäverkon tarvitsemien tietojen tallennukseen, joita tietoja ei ole saatavissa verkkoelementin 11 avulla liitettävistä laitteista. Alan ammattimiehelle on selvää, että verkkoelementissä 11 sijaitsevaa tietokantaa 15 vastaavien tietojen tallennus voidaan toteuttaa myös muulla tavoin kuin edellä on esitetty. Erään edullisen suoritusmuodon mukaisesti verkkoelementti 11 voi olla toteutettu esim. siten, että tietokantaa 15 vastaavat tiedot voi olla tallennettu operaattorin tiloissa olevaan järjestelmään, josta kyseiset tiedot voidaan tarvittaessa lukea. Tämä ei kuitenkaan välttämättä olisi kovinkaan järkevää, sillä tällaisella esimerkinomaisella järjestelyllä verkko kuormittuisi turhaan lisääntyneen signaaliliikenteen vuoksi. Tilaajaliittymää koskevien tietojen keskitys yhteen tietokantaan kuitenkin toisi keskittämiseen tyypillisesti liittyvät edut.

Eräässä keksinnön mukaisessa suoritusmuodossa verkkoelementin 11 tulopuolelle 16 voidaan kytkeä tavallisia kiinteän verkon tilaajalaitteita 21. Eräs esimerkki tällaisesta järjestelystä on esitetty kuvassa 2. Tällaisessa toteutusmuodossa verkkoelementin avulla isäntäverkkoon liitettävä järjestelmä voi esim. käsittää vain tavallisia puhelimia ja niiden tarvitsemat liitälaitteet. Kiinteä tilaajalaitte 21 voidaan kytkeä verkkoelementtiin 11 tuloyksikön 16 eli edullisesti esim. erityisen tilaajaliitännäiskortin välityksellä. Useamman kiinteän tilaajalaitteen 21 kytkeminen verkkoelementtiin 11 voidaan toteuttaa esim. siten, että jokaista kiinteää tilaajalaitetta 21 kohden on yksi tilaajaliitännäkortti. Kytkeminen voidaan myös järjestää siten, että kaikki kiinteät tilaajalaitteet 21 kytketään verkkoelementtiin 11 yhden tilaajaliitännäkortin välityksellä. Myös muita ratkaisuja voidaan edullisesti käyttää tilaajalaitteiden kytkemiseksi verkkoelementtiin 11. Tällaisessa toteutusmuodossa verkkoelementti 11 toteuttaa tilaajalaitteiden 21 suuntaan tilaajalaitteiden edellyttämät toiminnot, kuten esim. off-hook ja on-hook-tilojen tunnistuksen, hälytyssignaalin antamisen ja muut tarvittavat toiminnot. Kiinteät tilaajalaitteet 21 tunnistetaan jollakin tunnetulla tavalla, kuten esim. sen perusteella, minkä signaalilinjan välityksellä tilaajalaitteen signaalit saapuvat verkkoelementtiin. Tilaajalaitteiden tunnistus voidaan toteuttaa esim. myös signaaloinnin avulla, mistä esitetään myöhemmin eräitä esimerkkejä.

Kuvassa 2 esitetään myös pieni osa isäntäverkkoa ja sen eri elementtejä 92, 93, 94, 90'. Tässä esimerkissä isäntäverkko käsittää matkaviestinverkkoon tyypillisesti kuuluvia elimiä kuten tukiasemia 92, yhtä tai useampaa tukiasemaa ohjaavia tukiasemaohjaimia 93 ja matkaviestinkeskuksia 94. Kuvassa 2 esitetään myös tukiasemiin 91 yhteydessä olevia matkaviestimiä 92 ja isäntäverkon loppuosa 90'. Kuvan 2



esimerkissä verkkoelementti 11 on kytketty matkaviestinkeskukseen 94, jolloin verkkoelementti 11 toteuttaa matkaviestinkeskuksen ja tukiasemaohjaimen välisen rajapinnan mukaisen toiminnallisuuden. Isäntäverkkoon päin verkkoelementti 11 näyttää tässä esimerkissä siten tukiasemaohjaimelta. Tällaisessa toteutusmuodossa

5 lähtöyksikkö 13 toteuttaa verkkoelementin ja matkaviestinkeskuksen välisen siirtolinjan edellyttämän toiminnallisuuden. GSM-verkossa tämä matkaviestinkeskuksen (MSC) ja tukiasemaohjaimen (BSC) välinen rajapinta 95a on ns. A-rajapinta. UMTS-verkon tapauksessa vastaava rajapinta on Iu-rajapinta.

10 Kuvan 2 mukaisessa järjestelmässä puhelun yhdistäminen tilaajalaitteeseen 21 voi keksinnön erään edullisen toteutusmuodon mukaan tapahtua esim. seuraavasti. Oletetaan, että tietoliikenneverkko 90' on GSM-verkko, joka on yhteydessä tavanomaiseen puhelinverkkoon. Kun puhelu tavanomaisesta puhelinverkosta saapuu GSM-verkkoon, puhelu ohjautuu siihen GSM-verkon MSC:hen, jonka alueelle tilaajalaite

15 21 on rekisteröitynyt. Tämä MSC havaitsee, että tilaajalaite on rekisteröity sijaitsevan sen BSC:n alueelle, jota verkkoelementti 11 emuloi. Tällöin MSC lähettää paging-viestin verkkoelementille 11, joka vastaa MSC:lle A-rajapinnan mukaisella page response -viestillä. Verkkoelementti muuntaa paging-viestin mainitseman IMSI-koodin omaksi tunnisteekseen eli suorittaa tarvittavan identiteettimuunnoksen, mitä

20 kuvan 2 esimerkissä vastaa IMSI-koodia vastaavan tilaajajohdon selvittäminen. Tämän jälkeen verkkoelementti antaa hälytyssignaalin kyseiseen tilaajajohtoon. Kun käyttäjä vastaa puheluun, verkkoelementti aloittaa puhesignaalien muuntamisen tilaajalaitteen ja GSM-verkon välillä. Puhelun avauksen yhteydessä MSC tyypillisesti tarkistaa autentikointiproseduurin avulla, että kyseinen päätelaite on juuri oikea

25 päätelaite. Tällaisessa tapauksessa verkkoelementti 11 emuloi päätelaitteen toimintaa tältä osin verkkoelementin tilaajatietojen avulla.

Eräässä keksinnön edullisessa toteutusmuodossa kaikkia tilaajaliittymän tietoja, joita ei ole saatavilla tilaajalaitteista 21, ei tallenneta tietokantaan 15, vaan ainakin osa

30 näistä tiedoista muodostetaan automaattisesti aina silloin, kun kyseisiä tietoja tarvitaan. Tällä tavoin voidaan pienentää tietokantaan tallennettavien tietojen määrää. Tiedot voidaan muodostaa automaattisesti esim. jonkin muuttumattomana pysyvän tiedon kuten liittymän puhelinnumeron perusteella, jolloin muodostamistavan pysyessä samana myös automaattisesti muodostettu tieto on joka kerta sama. Näin voidaan muodostaa esim. jokin tilaajatietoihin liittyvä kiinteä tieto kuten esim. päätelaitteen tunnistetieto. Mikäli tarvittavan tiedon ei tarvitse pysyä samana eri kertojen välillä, tarvittava tieto voidaan generoida myös esim. kellonajan perusteella tai satunnaisesti.

Mikäli joitakin tietoja kuten esim. tiettyjä turvallisuusparametreja ei voida siirtää SIM-kortilta pois, on tällaisten tietojen kohdalla järjestettävä tietojen kopiointi SIM-kortilta verkkoelementille. Tällaisessa tilanteessa verkko edullisimmin varmistaa turvallisuusvaatimusten mukaisesti, että vain yhtä näistä tiedoista todella käytetään.

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Eräässä keksinnön edullisessa toteutusmuodossa verkkoelementti 11 voidaan kytkeä paikallisen puhelinverkon keskus- tai kytkentälaitteeseen tai muuhun vastaavaan elimeen. Kuvassa 3 on esitetty eräs tällainen ratkaisu, jonka mukaisesti verkkoelementti 11 on toiminnallisesti kytketty paikallisen puhelinverkon keskuslaitteeseen

10 31. Verkkoelementtiin 11 voidaan kuvan mukaisesti kytkeä myös useampi kuin yksi keskuslaite 31 joko suoraan kuvan 3 esittämällä tavalla tai edelleen muiden keskuslaitteiden välityksellä. Tällaisessa toteutusmuodossa tilaajalaitteen tunnistus voidaan toteuttaa esim. keskuslaitteiden 31 käyttämän signaloinnin avulla. Eräinä esimerkkeinä mahdollisista signalointimenetelmistä voidaan mainita tavanomaisessa puhelinverkossa käytettävät ISUP-, SS7- ja R2 -signalointiprotokollat. Tällaisessa toteutusmuodossa verkkoelementti 11 emuloi liitettävien keskuslaitteiden suuntaan haluttua keskuslaitteiden tuntemaa rajapintaa tai esim. toista keskuslaitetta. Kuvassa 3

15 esitetään myös isäntäverkko 90.

20 Kuvassa 4 esitetään keksinnön sellainen edullinen toteutusmuoto, jossa verkkoelementin 11 avulla isäntäverkkoon on liitetty toinen radioverkko 41. Toinen radioverkko 41 voi olla esim. yrityksen sisäinen radioliikenneverkko tai langaton sisäpuhelinverkko. Kuvan 4 esimerkissä radioverkko 41 käsittää tukiasemia 43 ja radioverkon keskuslaitteita 42. Radioverkko 41 käsittää myös langattomia päätelaitteita

25 44, jotka ovat yhteydessä muuhun radioverkkoon 41 tukiasemien 43 välityksellä. Tällaisessa sovellusmuodossa langattomat päätelaitteet 44 vastaavat edellisten esimerkkien tilaajalaitteita 21, jolloin verkkoelementti toteuttaa isäntäverkon suuntaan tapahtuvan emuloinnin muistiinsa tallennettujen isäntäverkon liittymätietojen ja langattomien päätelaitteiden 44 tunnistetietojen perusteella. Tällaisessa sovellusmuodossa verkkoelementti 11 toteuttaa radioverkkoon 41 päin halutun radioverkon 41

30 rajapinnan toiminnallisuuden. Esimerkiksi, langattoman sisäpuhelinjärjestelmän kuten DECT-järjestelmän tapauksessa verkkoelementti 11 voi emuloida tavanomaisen puhelinjärjestelmän keskuslaitetta DECT-järjestelmän 41 suuntaan, jolloin DECT-järjestelmän kannalta tilanne on sama kuin tunnetun tekniikan mukaisessa tapauksessa, jossa DECT-järjestelmä on kytketty johonkin kiinteään puhelinverkon keskukseen, kuten yrityksen tai rakennuksen puhelinkeskukseen.

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Yleisesti, keksinnöllisen verkkoelementin avulla voidaan toteuttaa sellaisia isäntäverkon päätelaitteiden kuten matkaviestinten toimintoja, joita isäntäverkkoon liitetävän järjestelmän päätelaitteet eivät toteuta. Erityisesti verkkoelementin avulla voidaan toteuttaa prosessointia vaativia toimintoja, joita mainitun järjestelmän päätelaitteet eivät kykene toteuttamaan esim. sen vuoksi, että päätelaitteissa ei ole prosessoria, että päätelaitteiden prosessointikapasiteetti on liian pieni kyseisen toimintojen toteuttamiseksi, tai että päätelaitteeseen ei voida tallentaa isäntäverkon tarvitsemia tilaajatietoja. Edellisten esimerkkien mukainen SIM-kortin täydellinen emulointi on siten vain eräs edullinen esimerkki tällaisista toiminnoista.

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Edellä on esitetty esimerkinomaisesti, että verkkoelementti edullisesti käsittää isäntäverkon suuntaan tapahtuvaan emulointiin eli toimintojen toteuttamiseen tarvittavat lisätiedot, kuten esim. tarvittavat matkaviestinverkon liittymätiedot, joita ei isäntäverkkoon liitettävästä järjestelmästä ole saatavilla. Eräissä suoritusmuodoissa voi lisäksi olla mahdollista, että isäntäverkosta ei ole saatavilla kaikkia isäntäverkkoon liitettävän järjestelmän tarvitsemia tietoja ja palveluita. Tällaisessa tapauksessa verkkoelementti emuloi liitettävän järjestelmän tarvitsemat palvelut verkkoelementtiin tallennettujen lisätietojen perusteella.

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- 20 Kuvassa 5 esitetään keksinnön sellainen edullinen toteutusmuoto, jossa verkkoelementin avulla isäntäverkkoon 90 liitetään esim. tietyn yrityksen tai rakennuksen tai muun yksikön sisäpuhelinverkko 51. Tässä sisäpuhelinverkko 51 voi esim. olla tavallinen sisäpuhelinverkko, yrityksen tai rakennuksen tietoliikenneverkon välityksellä toteutettu Intranet-puhelinverkko, DECT-verkko tai jokin muu sisäpuhelinverkko.
- 25 Kuvan 5 esimerkissä sisäpuhelinverkko käsittää useita tilaajalaitteita 21.

Verkkoelementin 11 tuloyksikköön 16 voidaan kytkeä myös jokin muu verkko, jota ei edellä ole mainittu. Alan ammattimiehelle on itsestään selvää, että verkkoelementin 11 avulla isäntäverkkoon 90 voidaan liittää myös jokin kombinaatio edellä esimerkinomaisesti esitetyistä verkoista tai muista vastaavista verkoista.

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Verkkoelementti voi toteuttaa isäntäverkon suuntaan myös muunlaisia kuin edellä esitettyjä rajapintoja. Kuvassa 6 esitetään keksinnön erään edullisen toteutusmuodon mukainen rakenne. Kuvassa 6 verkkoelementtiin on kytketty useita tilaajalaitteita 21, ja verkkoelementin 11 ja isäntäverkon 92, 93, 90 välinen rajapinta on radorajapinta 95b. Tällaisessa sovellusmuodossa verkkoelementti emuloi joukkoa matkaviestimiä. Kuvassa 6 esitetään isäntäverkon 90 komponenteista tukiasemia 92 ja tukiasemaohjain 93. Tällaisessa sovellusmuodossa verkkoelementti käsittää siten lä-

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hetinyksikön, johon on kytketty tarvittavat antennilaitteistot. Tällainen lähetinyksikkö voidaan toteuttaa esim. lähtöyksikköön 13.

Kuvassa 7 esitetään keksinnön erään edullisen toteutusmuodon mukainen rakenne.

- 5 Kuvassa 7 verkkoelementti toteuttaa tukiaseman ja tukiasemaohjaimen välisen rajapinnan 95c, jolloin isäntaverkon kannalta verkkoelementti toimii kuten tukiasema. Sellaisessa toteutusmuodossa, jossa isäntaverkkona toimii GSM-verkko, rajapinta 95c on siten Abis-rajapinta. Sellaisessa toteutusmuodossa, jossa isäntaverkkona toimii UMTS-verkko, rajapinta 95c on siten Iub-rajapinta.

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Verkkoelementissä 11 voi olla muitakin elimiä, kuin mitä edellä esitetyissä esimerkeissä käy ilmi. Tällaisia elimiä voivat olla esim. tiedonsiirtonopeuden muuntamiseen tarkoitetut elimet, joita tarvitaan, kun verkkoelementti 11 on kahden eri tiedonsiirtonopeutta käyttävän verkon välissä. Myös muita tarvittavia sovituselimä

15 voidaan sijoittaa verkkoelementtiin 11.

Keksintö ei rajoitu minkään tietyn isäntaverkon tai tiettyjen isäntaverkkojen käyttöön. Keksintöä voidaan käyttää hyvin monenlaisten isäntaverkkojen kanssa. Isäntaverkkona voi toimia esimerkiksi edellämainitut GSM- ja UMTS-järjestelmät. Keksintö ei myöskään rajoita tekniikoita, joilla isäntaverkko on toteutettu. Isäntaverkko voi hyödyntää esimerkiksi pakettiliikenteeseen pohjautuvaa tekniikkaa, kuten esimerkiksi IP-verkkotekniikkaa.

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Edellä on esitetty esimerkinomaisesti, että verkkoelementin avulla kytkettävät signaalit ovat puhesignaaleja. Keksintö ei kuitenkaan rajoitu tähän. Esimerkiksi, jos sekä isäntaverkko että isäntaverkkoon liitettävä järjestelmä tukevat myös muunlaisia tiedonsiirtoyhteyksiä, kytkettävät signaalit voivat olla myös muuta dataa käsittäviä signaaleja kuin puhesignaaleja.

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Tietyn toiminnallisen yksikön, kuten tukiasemaohjaimen nimi on usein erilainen eri matkaviestinjärjestelmissä. Esimerkiksi, GSM-järjestelmän tukiasemaohjainta (BSC, base station controller) lähinnä vastaava elin UMTS-järjestelmässä on eräiden spesifikaatioiden mukaan nimeltään radioverkko-ohjain (RNC, radio network controller). Oheisissa vaatimuksissa termejä tukiasemaohjain ja matkaviestinkeskus ei ole rajoitettu millään tavalla tarkoittamaan vain GSM-verkon elimiä, vaan termit katta-

35 vat myös muiden matkaviestinjärjestelmien toiminnallisesti lähinnä vastaavat elimet. Oheisissa patenttivaatimuksissa termi tilaajalaite tarkoittaa liitettävän järjestelmän

vastaavaa laitetta, kuten esim. kiinteän puhelinverkon tavanomaista puhelinta, langattoman sisäpuhelinverkon päätelaitetta tai vastaavaa laitetta.

- 5 Edellä keksintöä on selostettu eräisiin sen edullisiin sovellusmuotoihin viittaamalla, mutta on selvää, että keksintöä voidaan muunnella monin eri tavoin oheisten patenttivaatimusten määrittelemän keksinnöllisen ajatuksen mukaisesti.

## Patenttivaatimukset

1. Menetelmä tilaajalaitteita käsittävän järjestelmän liittämiseksi matkaviestin-  
verkkoon, **tunnettu** siitä, että matkaviestinverkkoon liitetyn verkkoelementin (11)  
5 avulla  
- toteutetaan mainitun matkaviestinverkon suuntaan haluttu mainitun matkaviestin-  
verkon rajapinta,  
- toteutetaan mainitun järjestelmän suuntaan haluttu mainitun järjestelmän rajapinta,  
ja  
10 - kytketään mainitun järjestelmän signaaleja matkaviestinverkkoon ja matkaviestin-  
verkon signaaleja mainittuun järjestelmään.
2. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että menetelmässä  
verkkoelementtiin tallennetaan ainakin osa matkaviestinverkon päätelaitteen tilaaja-  
15 tietoja vastaavista tilaajatiedoista.
3. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että mainitun  
verkkoelementin (11) avulla toteutetaan matkaviestinverkon sellaisia matkaviestin-  
verkon matkaviestimiin liittyviä toimintoja, joita mainitun järjestelmän tilaajalaitteet  
20 eivät toteuta.
4. Patenttivaatimuksen 2 ja 3 mukainen menetelmä, **tunnettu** siitä, että  
ainakin osa mainituista toiminnoista ovat tilaajatiedoista riippuvia toimintoja.
- 25 5. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että verkkoele-  
mentin avulla vastaanotetaan signaaleja mainitusta järjestelmästä, jotka signaalit  
saapuvat signaalilinjoilta, joita on tietty ensimmäinen määrä, ja keskitetään vastaan-  
otettuja signaaleja matkaviestinverkon signaalilinjaille, joita on tietty toinen määrä,  
jolloin mainittu toinen määrä on pienempi kuin mainittu ensimmäinen määrä.  
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6. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että mainittu raja-  
pinta on tukiasemaohjaimen ja matkaviestinkeskuksen välinen rajapinta.
7. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että mainittu raja-  
35 pinta on tukiasemaohjaimen ja tukiaseman välinen rajapinta.
8. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että mainittu raja-  
pinta on matkaviestimen ja tukiaseman välinen radiorajapinta.

9. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että ainakin osa verkkoelementin (11) tarvitsemista matkaviestinverkon tilaajatiedoista luetaan verkkoelementtiin tallennetusta tietokannasta (15).
- 5 10. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että ainakin osa verkkoelementin (11) tarvitsemista matkaviestinverkon tilaajatiedoista muodostetaan automaattisesti.
- 10 11. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että mainittu järjestelmä käsittää ainakin yhden kiinteän puhelinverkon.
12. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että mainittu järjestelmä käsittää ainakin yhden radioverkon (41).
- 15 13. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että mainittu järjestelmä käsittää ainakin yhden sisäpuhelinverkon (51).
14. Verkkoelementti (11), **tunnettu** siitä, että se on sovitettu liitettäväksi matkaviestinverkkoon tilaajalaitteita käsittävän järjestelmän liittämiseksi matkaviestinverkkoon mainitun verkkoelementin välityksellä, ja siitä, että se käsittää
- 20 - emulointilohkon mainitusta järjestelmästä puuttuvien matkaviestinverkon toimintojen toteuttamiseksi ja
- kytkentälohkon mainitusta järjestelmästä tulevien signaaleiden kytkemiseksi matkaviestinverkkoon.
- 25 15. Patenttivaatimuksen 14 mukainen verkkoelementti, **tunnettu** siitä, että se käsittää muistielimen matkaviestinverkon tilaajatietojen tallentamiseksi.
- 30 16. Patenttivaatimuksen 14 mukainen verkkoelementti, **tunnettu** siitä, että mainittu emulointilohko on järjestetty toteuttamaan matkaviestinverkon sellaisia matkaviestinverkon matkaviestimiin liittyviä toimintoja, joita mainitun järjestelmän mainitut tilaajalaitteet eivät toteuta.
- 35 17. Patenttivaatimuksen 14 mukainen verkkoelementti, **tunnettu** siitä, että se käsittää emulointilohkon lisäksi lähtöyksikön (13) mainitun matkaviestinverkon ennalta määrätyn rajapinnan mukaisen toiminnallisuuden toteuttamiseksi.

18. Patenttivaatimuksen 17 mukainen verkkoelementti, **tunnettu** siitä, että mainittu rajapinta on tukiasemaohjaimen ja matkaviestinkeskuksen välinen rajapinta.
19. Patenttivaatimuksen 17 mukainen verkkoelementti, **tunnettu** siitä, että mainittu rajapinta on tukiaseman ja tukiasemaohjaimen välinen rajapinta.
20. Patenttivaatimuksen 17 mukainen verkkoelementti, **tunnettu** siitä, että mainittu rajapinta on matkaviestimen ja tukiaseman välinen radorajapinta.
21. Patenttivaatimuksen 14 mukainen verkkoelementti, **tunnettu** siitä, että se lisäksi käsittää tietokantalohkon (15) mainitun järjestelmän tilaajalaitteita vastaavien matkaviestinverkon liittymätietojen tallentamiseksi.



**(57) Tiivistelmä**

Tässä julkaisussa on kuvattu menetelmä ja laite, jolla tilaajalaite tai tilaajaverkko voidaan liittää matkaviestinverkkoon. Keksinnön ajatuksena on se, että matkaviestinverkon ja tilaajalaitteen tai -verkon väliin laitetaan verkkoelementti (11), joka emuloi molempien siihen kiinnitettyjen verkkojen suuntaan oikeaa rajapintaa. Lisäksi verkkoelementin (11) tehtävänä on kytkeä ja tarvittaessa myös keskittää puheluja matkaviestinverkon ja tilaajaverkon välillä. Lisäksi verkkoelementti (11) käsittelee edullisesti tietokantalohkon (15), johon on tallennettu matkaviestinverkon tarvitsemat matkaviestinverkkoon liitettävän tilaajaverkon tilaajalaitteita vastaavat tilaajatiedot.